Updated 15 September 2005

Journal of Quantitative Spectroscopy & Radiative Transfer 88 (2004) 357–406

Journal of Quantitative Spectroscopy & Radiative Transfer

www.elsevier.com/locate/jqsrt

T-matrix theory of electromagnetic scattering by particles and its applications: a comprehensive reference database

Michael I. Mishchenko[a,*], Gorden Videen[b], Victor A. Babenko[c], Nikolai G. Khlebtsov[d], Thomas Wriedt[e]

[a] *NASA Goddard Institute for Space Studies, 2880 Broadway, New York, NY 10025, USA*
[b] *US Army Research Laboratory, AMSRL-IS-EE, 2800 Powder Mill Road, Adelphi, MD 20783-1197, USA*
[c] *Stepanov Institute of Physics, National Academy of Science of Belarus, Scaryna Ave. 68, 220072 Minsk, Belarus*
[d] *Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, 13 Entuziastov Ave., 410015 Saratov, Russia*
[e] *Institut für Werkstofftechnik, Badgasteiner Str. 3, D-28359 Bremen, Germany*

Abstract

The *T*-matrix method is one of the most powerful and widely used theoretical techniques for the computation of electromagnetic scattering by single and composite particles, discrete random media, and particles in the vicinity of an interface separating two half-spaces with different refractive indices. This paper presents a comprehensive database of *T*-matrix publications since the inception of the technique in 1965 through early 2004.

Keywords: Electromagnetic scattering; *T*-matrix method

1. Introduction

Since its formulation in 1965, the *T*-matrix method has become one of the most powerful, versatile, and popular theoretical techniques for treating electromagnetic, acoustic, and elastodynamic scattering by particles and surfaces. The most recent attempt to outline the vast realm of this technique and its practical applications by compiling a comprehensive publication database dates back to 1988 (Varadan et al., 1988); that list included 151 references. Although to attempt a similar compilation now would be very

* Corresponding author. Tel.: +1-212-678-5590; fax: +1-212-678-5622.
E-mail address: crmim@giss.nasa.gov (M.I. Mishchenko).

0022-4073/$ - see front matter
doi:10.1016/j.jqsrt.2004.05.002

important, it is next to impossible. To make the task both useful and practicable, one has to be selective and to adhere firmly to well defined and meaningful guidelines. The three most important restrictions that we have adopted for this database are the following:

- With a few important exceptions, the database includes only publications dealing with electromagnetic scattering.
- As a rule, publications on scattering by isolated infinite cylinders and systems of parallel infinite cylinders in unbounded space are excluded.
- The database includes only references to books, peer-reviewed book chapters, and peer-reviewed journal papers.

Even with these restrictions, the database contains more than 700 references.

A critical issue that we faced at the outset of this project was to agree on a definition of the *T*-matrix method. The concept of a *T* matrix has evolved quite dramatically since it was first introduced by P.C. Waterman in 1965. From being a minor bi-product of the extended boundary condition method, it has become the centerpiece of a vast domain of wave scattering science. We hope that we will not step on too many toes by suggesting the following definition:

> In the *T*-matrix method, the incident and scattered electric fields are expanded in series of suitable vector spherical wave functions, and the relation between the columns of the respective expansion coefficients is established by means of a transition matrix (or *T* matrix). This concept can be applied to the entire scatterer as well as to separate parts of a composite scatterer.

It is clear that in the framework of this definition, the classical Lorenz–Mie theory for homogeneous isotropic spheres and its generalizations for inhomogeneous spherically symmetric particles become a particular case of the *T*-matrix approach. Therefore, another inescapable restriction that we had to impose on this database was to exclude all references dealing with individual spherically symmetric scatterers. We hope that the reference list of the recent monograph by Babenko et al. (2003) will be at least a partial remedy for this deficiency.

In addition to compiling a unified masterlist of *T*-matrix publications on electromagnetic scattering by particles, we have tried to make the database more useful by classifying the various references into a set of narrower subject categories (Sections 2 and 3). Depending on the specific content of a publication, it may appear in one or several subject categories. The choice of the subject categories, especially categories such as *Seminal publications*, and assigning a publication to a category are somewhat subjective and are open to criticism. We feel, however, that the pros of this endeavor in terms of its utility to various categories of customers far outweigh its potential cons.

What we have not done in this paper is to assess the validity and importance of the results described in the specific publications included in the database. It is not inconceivable that some of the publications contain wrong results or duplicate results obtained in earlier publications. We believe that a critical assessment of the *T*-matrix publications should be the subject of a book or a review and is beyond the scope of this paper. Therefore, the reader should keep in mind that the inclusion of a publication in this database does not constitute any formal endorsement or quality certification on our part.

We realize that even with the restrictions adopted, it will be impossible to publish in a research journal another comprehensive database like this one even in a few years from now (see Fig. 1). However, we plan to maintain an updated version of this database on the web site http://www.giss.nasa.gov/∼crmim

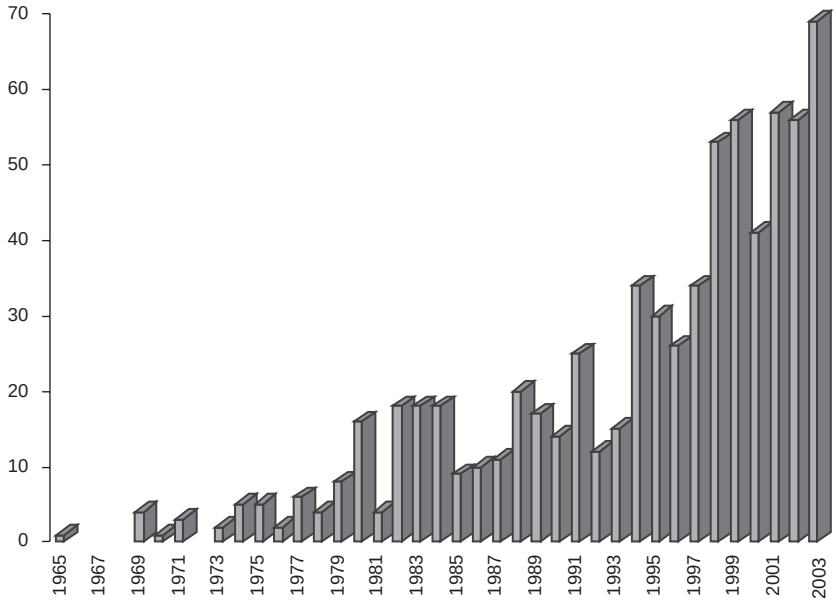

Fig. 1. Annual frequency distribution of the *T*-matrix publications.

and ask the readers to help us in this endeavor by sending corrections and missing references to existing and future publications on the *T*-matrix method and its various applications.

2. Particles in infinite homogeneous space

2.1. Seminal publications

This subsection references the publications in which the *T*-matrix method was originally developed as well as those in which a major generalization or improvement of the *T*-matrix method was proposed.

Bruning and Lo (1971a)
Khlebtsov (1992)
Lakhtakia et al. (1983)
Mackowski and Mishchenko (1996)
Mishchenko (1991a)
Peterson and Ström (1973)
Peterson and Ström (1974)
Rozenberg (1974)
Schulz et al. (1999a)
Tsang and Kong (1980)
Varadan and Varadan (1980a)
Varadan et al. (1979)
Waterman (1965)
Waterman (1969)
Waterman (1971)

2.2. Books

Barber and Hill (1990)
Borghese et al. (2003)
Chew (1995)
Doicu et al. (2000c)
Mishchenko et al. (2002)
Rozenberg (1974)
Tsang and Kong (2001)
Tsang et al. (1985)
Tsang et al. (2000)
Tsang et al. (2001)
Varadan and Varadan (1980b)

2.3. Reviews

Barber (1980)
Fuller and Mackowski (2000)
Mishchenko et al. (1996b)
Mishchenko et al. (2000b)
Ström and Zheng (1989)
Waterman (1980)

2.4. Extended boundary condition method and its modifications and generalizations

Al-Badwaihy and Yen (1975)
Babenko (1997)
Babenko (1999)
Barber and Yeh (1975)
Bates and Wall (1977)
Boström (1982)
Bringi and Seliga (1977b)
Doicu (1999)
Doicu (2002)
Doicu and Wriedt (1997a)
Doicu and Wriedt (1997b)
Doicu and Wriedt (1997c)
Doicu and Wriedt (1999)
Doicu and Wriedt (2001b)
Doicu and Wriedt (2001c)
Doicu and Wriedt (2001d)
Doicu et al. (1999b)
Eremina and Wriedt (2003)
Hizal (1980)
Iskander and Lakhtakia (1984)
Iskander et al. (1982)
Iskander et al. (1983)
Iskander et al. (1989b)
Lakhtakia et al. (1983)
Lakhtakia et al. (1984b)
Morita (1979)
Peterson and Ström (1974)
Ström (1975)
Ström (1991a)
Ström (1991b)
Ström and Zheng (1987)
Ström and Zheng (1988)
Wang et al. (1994)
Waterman (1965)
Waterman (1969)
Waterman (1971)
Waterman (1979)
Wriedt and Doicu (1997)
Wriedt and Doicu (1998b)
Wriedt and Doicu (1998c)
Zheng and Ström (1989)

2.5. T-matrix theory and computations for anisotropic and chiral scatterers

Doicu (2003)
Kiselev et al. (2002)
Lakhtakia (1991)
Lakhtakia et al. (1985)
Liu et al. (2000b)
Sharma and Balakrishnan (1998)

2.6. Superposition T-matrix method and its modifications, including related mathematical tools

Auger and Stout (2003)
Auger et al. (2001)
Borghese et al. (1979)
Borghese et al. (1980)
Borghese et al. (1994)
Boström et al. (1991)
Bruning and Lo (1971a)
Bruning and Lo (1971b)
Chew (1990)
Chew et al. (1990)
Cruzan (1962)
Chew and Wang (1993)
Danos and Maximon (1965)
Fikioris and Uzunoglu (1979)
Fuller (1994)
Fuller and Kattawar (1988a)
Fuller and Kattawar (1988b)
Gérardy and Ausloos (1982)
Hamid et al. (1990b)
Mackowski (1991)
Mackowski (1994)
Mackowski (2001)
Mackowski and Mishchenko (1996)
Mishchenko and Mackowski (1994)
Miyazaki and Jimba (2000)
Ngo et al. (1996)
Ngo et al. (1997)
Peterson (1977)
Peterson and Ström (1973)
Rozenberg (1974)
Saija et al. (2003b)
Siqueira and Sarabandi (2000)
Stein (1961)
Stout et al. (2001)
Stout et al. (2002a)
Ström (1974)
Tzeng and Fung (1994)
Videen and Bickel (1991)
Videen and Ngo (1998)
Videen et al. (1995)
Videen et al. (1996)
Wang and Chew (1993)
Wittmann (1988)
Xu (1996a)
Xu (1996b)
Xu (1997b)
Xu (1998b)

2.7. T-matrix theory of electromagnetic scattering by infinite periodic arrays of particles

Modinos (1987)
Peterson (1977)
Varadan (1980)
Waterman and Pedersen (1986)

2.8. T-matrix theory and computations of electromagnetic scattering by discrete random media

Bringi et al. (1982a)
Bringi et al. (1982b)
Bringi et al. (1983)
Chew (1989)
Chen et al. (2003)
Chew et al. (1990)
Doicu and Wriedt (2001a)
Guo et al. (2001)
Lu et al. (1995)
Ma et al. (1988)
Neo et al. (1999)
Siqueira and Sarabandi (2000)
Stefanou and Modinos (1993)
Tishkovets (2002)
Tishkovets and Mishchenko (2004)
Tishkovets et al. (2002)
Tishkovets et al. (2004a)
Tsang (1984)
Tsang and Kong (1982)
Tsang and Kong (1983)

Tsang et al. (1992)
Varadan (1980)
Varadan and Varadan (1980a)
Varadan et al. (1979)
Varadan et al. (1983)
Varadan et al. (1984)
Varadan et al. (1985a)
Varadan et al. (1985b)
Varadan et al. (1987)
West et al. (1994)

2.9. Relation of the T-matrix method to other theoretical approaches

Agarwal (1976)
Bates (1969)
Bates (1975)
Bolomey and Wirgin (1974)
Burrows (1969)
Doicu (1999)
Doicu and Wriedt (1999)
Doicu et al. (1999b)
Doicu et al. (2000b)
Eremin (1995)
Eremin (1998)
Farafonov (2002)
Farafonov et al. (2003)
Hill et al. (1997)
Kahnert et al. (2003)
Kleinman et al. (1984)
Lewin (1970)
Lu and Chew (1995)
Mackowski (2002)
Martin (2003)
Millar (1969)
Morgan et al. (1984)
Nieminen et al. (2003a)
Rother (1998)
Rother et al. (2002)
Schmidt et al. (1998)
Schulz et al. (1998a)
Videen et al. (1998)
Wriedt and Doicu (1997)
Zurk et al. (1995)
Zurk et al. (1996)

2.10. Symmetry properties of the T matrix and analytical orientation averaging approaches

Battaglia et al. (2001b)
Borghese et al. (1984b)
Borghese et al. (2001)
Fucile et al. (1993)
Fucile et al. (1995)
Havemann and Baran (2001)
Kahnert et al. (2001a)
Khlebtsov (1991)
Khlebtsov (1992)
Mackowski (1994)
Mackowski and Mishchenko (1996)
Mishchenko (1989)
Mishchenko (1990b)
Mishchenko (1990c)
Mishchenko (1990d)
Mishchenko (1991a)
Mishchenko (1991b)
Mishchenko (1991c)
Mishchenko (1991e)
Mishchenko (1992a)
Mishchenko and Mackowski (1994)
Paramonov (1994c)
Paramonov (1994e)
Paramonov (1995a)
Paramonov (1995b)
Paramonov and Lopatin (1990)
Schulz et al. (1999a)
Sindoni et al. (1984)
Skaropoulos (2003)
Skaropoulos and Russchenberg (2002)
Tsang et al. (1984)
Varadan (1980)
Varadan and Varadan (1980a)
Varadan et al. (1984)
Wielaard et al. (1997)

2.11. Convergence of various implementations of the T-matrix method

Aydin and Hizal (1979)
Bates and Wong (1974)
Dallas (2000)
Ding and Xu (1999)
Doicu et al. (2000b)
Hizal (1980)
Iskander et al. (1983)
Kahnert et al. (2001b)
Khlebtsov et al. (2000)
Kristensson and Waterman (1982)
Kristensson et al. (1983)
Lakhtakia et al. (1984a)
Lapalme and Patitsas (1993a)
Mishchenko (1993)
Mishchenko and Travis (1994a)
Mishchenko and Travis (1998)
Mishchenko et al. (1996a)
Ramm (1982)
Ramm (2002)
Siqueira and Sarabandi (2000)
Ström and Zheng (1987)
Wall (1980)
Waterman (1980)
Waterman (1983)
Wiscombe and Mugnai (1986)

2.12. Benchmark T-matrix results

By benchmark numerical results we understand numbers with at least 3 correct first significant decimals. The accuracy of the numbers must be established by either comparisons with results generated by an independent method or by implementing a reliable internal convergence test.

Hovenier et al. (1996)
Kuik et al. (1992)
Mishchenko (1991a)
Mishchenko (1991d)
Mishchenko (2000)
Mishchenko and Mackowski (1996)
Mishchenko et al. (1996a)
Voshchinnikov et al. (2000)
Wielaard et al. (1997)

2.13. T-matrix calculations for homogeneous spheroids

Abdulkin and Paramonov (2001)
Alpers et al. (2001)
Astafieva and Babenko (1999)
Aydin and Daisley (2002)
Aydin and Lure (1991)
Aydin and Walsh (1999)
Aydin and Zhao (1990)
Aydin et al. (1984)
Aydin et al. (1989)
Aydin et al. (1998)
Babenko and Petrov (2002)
Balzer et al. (1998)
Bantges et al. (1999)
Baran et al. (1998)
Barber (1977a)
Barber (1977b)
Barber (1978)
Barber and Hill (1988)
Barber and Massoudi (1982)
Barber and Wang (1978)
Barber and Yeh (1975)
Barber et al. (1981)
Barber et al. (1982)
Barber et al. (1983a)
Barber et al. (1983b)
Barksdale and Bostian (1988)
Battaglia et al. (2001a)
Battaglia et al. (2001b)

Bayoudh et al. (2003)
Bazhan et al. (2002)
Bonev et al. (2002)
Borrmann et al. (1996)
Borrmann et al. (2000)
Bringi and Seliga (1977a)
Bringi and Seliga (1980)
Bringi et al. (1998)
Brogniez et al. (2003)
Brooks et al. (2004)
Carey et al. (2000)
Chang et al. (2002)
Cline et al. (1986)
Crosta et al. (2003)
Czekala (1998)
Czekala and Simmer (1998)
Czekala and Simmer (2002)
Czekala et al. (1999)
Czekala et al. (2001a)
Czekala et al. (2001b)
Dlugach and Mishchenko (2004)
Dlugach and Petrova (2003)
Dlugach et al. (2002a)
Dlugach et al. (2002b)
Doicu (2002)
Doicu and Wriedt (1997a)
Doicu and Wriedt (1997b)
Doicu and Wriedt (1997c)
Doicu and Wriedt (1999)
Doicu et al. (1997)
Doicu et al. (1998)
Doicu et al. (1999b)
Doicu et al. (2000b)
Dubovik et al. (2002)
Durden (2003)
Enejder et al. (2003)
Flesia et al. (1994)
Fueglistaler et al. (2003)
Geller et al. (1985)
Glatter and Hofer (1988)
Gledhill and McCall (2000)
Gustafson et al. (2001)
Haferman (2000)
Haferman et al. (1997)
Heintzenberg et al. (2002)
Hill and Benner (1988)
Hill et al. (1984)
Hızal (1980)
Ho and Allen (1994)
Hofer and Glatter (1989)
Holt (1982)
Hogan et al. (2000)
Höpfner et al. (2001)
Hovenier et al. (1996)
Hu et al. (2002)
Ishimaru et al. (1984)
Iskander and Lakhtakia (1984)
Iskander et al. (1983)
Iskander et al. (1986)
Iskander et al. (1989a)
Iskander et al. (1989b)
Jakeman (2000)
Jalava et al. (1998)
Joshi et al. (2003)
Kahn et al. (1997)
Kahnert (2004)
Kahnert et al. (2002a)
Kahnert et al. (2002b)
Kalashnikova et al. (2005)
Keenan et al. (2001)
Kerola and Larson (2001)
Khlebtsov and Mel'nikov (1995)
Khlebtsov et al. (1994)
Khlebtsov et al. (1996a)
Khlebtsov et al. (1996b)
Khlebtsov et al. (1999a)
Khlebtsov et al. (1999b)
Kollias et al. (2001)
Kollias et al. (2002)
Kollias et al. (2003)
Kolokolova (2004)
Kolokolova et al. (1997)
Kouzoubov et al. (1998)
Kouzoubov et al. (1999)
Krotkov et al. (1997)
Krotkov et al. (1999)
Kuik et al. (1992)
Kuik et al. (1994)

Kummerow and Weinman (1988)
Lacis and Mishchenko (1995)
Lakhtakia and Iskander (1983a)
Lakhtakia et al. (1981)
Lakhtakia et al. (1982a)
Lakhtakia et al. (1982b)
Lakhtakia et al. (1983)
Lakhtakia et al. (1984a)
Lakhtakia et al. (1984c)
Lambert et al. (2003)
Latimer and Barber (1978)
Liang and Mishchenko (1997)
Liou et al. (1983)
Liu and Mishchenko (2001)
Liu et al. (2002)
Lopatin and Paramonov (1989)
Lopatin and Sid'ko (1988)
Lucas (2003)
Lumme (2000)
Lumme and Rahola (1998)
Luo et al. (2003)
Macke et al. (1995)
Mackowski (2002)
Massoudi et al. (1982)
Merchant et al. (1988)
Miao et al. (2003)
Min et al. (2003)
Mishchenko (1989)
Mishchenko (1990a)
Mishchenko (1990c)
Mishchenko (1990d)
Mishchenko (1991a)
Mishchenko (1991b)
Mishchenko (1991d)
Mishchenko (1991e)
Mishchenko (1991f)
Mishchenko (1992a)
Mishchenko (1992b)
Mishchenko (1992c)
Mishchenko (1993)
Mishchenko (1994)
Mishchenko (2000)
Mishchenko and Hovenier (1995)
Mishchenko and Lacis (2003)
Mishchenko and Macke (1998)
Mishchenko and Sassen (1998)
Mishchenko and Travis (1994a)
Mishchenko and Travis (1994b)
Mishchenko and Travis (1994c)
Mishchenko and Travis (1998)
Mishchenko et al. (1995a)
Mishchenko et al. (1995b)
Mishchenko et al. (1997a)
Mishchenko et al. (1997b)
Mishchenko et al. (2000a)
Morel et al. (2002)
Mourant et al. (2002)
Mroczka et al. (2002)
Müller et al. (2003)
Nieminen et al. (2001a)
Nieminen et al. (2001b)
Nilsson et al. (1998)
Nousiainen and Vermeulen (2003)
Oppel et al. (2002)
Paramonov (1994a)
Paramonov (1994b)
Paramonov (1994d)
Paramonov and Lopatin (1989)
Paramonov et al. (1986a)
Paramonov et al. (1986b)
Paramonov et al. (1989)
Peter et al. (2003)
Petrova (1999a)
Petrova (1999b)
Petrova and Markiewicz (1997)
Pilinis and Li (1998)
Pitter et al. (1999)
Porco et al. (2003)
Porstendorfer et al. (1999)
Prodi et al. (1999)
Qingan et al. (1998)
Quirantes and Delgado (1995a)
Quirantes and Delgado (1995b)
Quirantes and Delgado (1998)
Reichardt et al. (2002)
Roberti and Kummerow (1999)
Roessler et al. (1983)
Ruppin (1998)

Ryde and Matijević (1994)
Sakai et al. (2002)
Sakai et al. (2003)
Schulz et al. (1998a)
Schulz et al. (1998b)
Schulz et al. (1999b)
Seliga and Bringi (1978)
Seow et al. (1998)
Shvalov et al. (2000)
Sid'ko et al. (1980)
Sinyuk et al. (2003)
Streekstra et al. (1994)
Thomas et al. (2002)
Toon et al. (1990)
Toon et al. (2000)
Troitsky et al. (2001)
Troitsky et al. (2003)
Tsang et al. (1984)
Tsias et al. (1999)
Tzeng et al. (1985)
Vargas and Niklasson (2001)
Vargas and Niklasson (2002)
Veihelmann et al. (2004)
Vivekanandan et al. (1991)
Voigt et al. (2003)
Voshchinnikov et al. (2000)
Wang et al. (1980)
Warner (1975)
Warner and Hizal (1976)
Waterman (1971)
Waterman (1979)
Wauben et al. (1993)
Whitney and Wolff (2002)
Wielaard et al. (1997)
Wirth et al. (1999)
Wolff and Clancy (2003)
Wong et al. (2004)
Wriedt and Doicu (1998b)
Xing and Greenberg (1994a)
Xing and Greenberg (1994b)
Yeh et al. (1982b)
Yilmaz et al. (2003)
Zakharova and Mishchenko (2000)
Zhao and Hu (2003)
Zrnić et al. (2000)

2.14. *T-matrix calculations for Chebyshev and generalized Chebyshev particles*

Battaglia et al. (2001b)
Chýlek and Ramaswamy (1982)
Chylek et al. (1981)
Crosta et al. (2001)
Crosta et al. (2003)
Ding and Xu (1999)
Flesia et al. (1994)
Mannoni et al. (1996)
Mishchenko (1989)
Mishchenko (1990c)
Mishchenko (1990d)
Mishchenko (1991a)
Mishchenko (1991d)
Mishchenko (1994)
Mishchenko (2000)
Mishchenko and Lacis (2003)
Mishchenko and Sassen (1998)
Mishchenko and Travis (1994b)
Mugnai and Wiscombe (1980)
Mugnai and Wiscombe (1986)
Mugnai and Wiscombe (1989)
Wiscombe and Mugnai (1986)
Wiscombe and Mugnai (1988)

2.15. *T-matrix calculations for finite circular cylinders*

Appleyard and Davies (2004)
Baran (2003)
Baran and Francis (2004)
Baran et al. (2003)

Barber (1977a)
Barber et al. (1982)
Baumgarten et al. (2002)
Ding and Xu (2002)
Dlugach and Mishchenko (2004)
Doicu and Wriedt (1997c)
Eremina and Wriedt (2003)
Evans et al. (1999)
Francis et al. (1999)
Gordon et al. (2001)
Havemann and Baran (2001)
Hovenier et al. (1996)
Kahn et al. (2003)
Kahnert et al. (2002a)
Kahnert et al. (2002b)
Khlebtsov et al. (2004a)
Kuik et al. (1994)
Lapalme and Patitsas (1993a)
Lapalme and Patitsas (1993b)
Lee et al. (2003)
Liu and Mishchenko (2001)
Liu et al. (1998)
Liu et al. (1999)
Mackowski (2002)
Merchant et al. (1988)
Miao et al. (2003)
Mishchenko (2000)
Mishchenko and Macke (1998)
Mishchenko and Macke (1999)
Mishchenko and Sassen (1998)
Mishchenko et al. (1996a)
Mishchenko et al. (1997b)
Nieminen et al. (2001)
Oppel et al. (2002)
Pulbere and Wriedt (2004)
Ruppin (1990)
Waterman (1971)
Waterman (1973)
Waterman (1979)
Wauben et al. (1993)
Wielaard et al. (1997)
Xing and Greenberg (1994)
Yang et al. (2003)
Yilmaz et al. (2003)
Zakharova and Mishchenko (2001)

2.16. *T-matrix calculations for various rotationally symmetric particles*

Aydin and Seliga (1984)
Aydin et al. (1984)
Barber and Massoudi (1982)
Barber and Yeh (1975)
Bates and Wong (1974)
Bringi and Seliga (1977a)
Bringi and Seliga (1980)
Doicu and Wriedt (1997c)
Hizal (1980)
Lakhtakia and Iskander (1983a)
Lakhtakia et al. (1983)
Lapalme and Patitsas (1993a)
Li et al. (2001)
Mishchenko and Videen (1999)
Mishchenko and Lacis (2003)
Ngo et al. (1997)
Prodi et al. (1999)
Schuh and Wriedt (2003)
Ström and Zheng (1987)
Sturniolo et al. (1995)
Videen et al. (1996)
Warner and Hizal (1976)
Waterman (1965)
Waterman (1971)
Waterman (1973)
Waterman (1979)
Waterman (1980)
Wriedt and Doicu (1997)
Yeh et al. (1982a)
Yeh et al. (1982b)

2.17. T-matrix calculations for ellipsoids, polyhedral scatterers, and other particles lacking axial symmetry

Baran and Francis (2004)
Baran et al. (2001a)
Baran et al. (2001b)
Björkberg and Kristensson (1987)
Havemann and Baran (2001)
Havemann et al. (2003)
Kahnert (2004)
Kahnert et al. (2001a)
Kahnert et al. (2001b)
Kahnert et al. (2002a)
Kahnert et al. (2002b)
Laitinen and Lumme (1998)
Mitchell et al. (2001)
Schneider and Peden (1988)
Schneider et al. (1991)
Wriedt (2002)
Wriedt and Comberg (1998)
Wriedt and Doicu (1998b)

2.18. T-matrix calculations for layered and composite particles

Aydin and Zhao (1990)
Aydin et al. (1983)
Bringi and Seliga (1977a)
Bringi and Seliga (1977b)
Cooper et al. (1983)
Doicu and Wriedt (2001b)
Doicu and Wriedt (2001c)
Doicu and Wriedt (2001d)
Hizal (1980)
Hofer and Glatter (1989)
Mazumder et al. (1992)
Quirantes (1999)
Quirantes and Delgado (2001)
Ström and Zheng (1988)
Ström and Zheng (1989)
Wang and Barber (1979)
Wang et al. (1979)
Zheng (1988)
Zheng (1989)
Zheng and Ström (1989)

2.19. T-matrix calculations for clusters of homogeneous spheres

Abel et al. (2003)
Andersen et al. (2002)
Andersen et al. (2004)
Arnold et al. (1994)
Auger and Stout (2003)
Auger et al. (2000)
Auger et al. (2003)
Borghese et al. (1984a)
Borghese et al. (1984b)
Borghese et al. (1984c)
Borghese et al. (1987b)
Borghese et al. (1989)
Borghese et al. (2001)
Botet et al. (1997)
Bruning and Lo (1971b)
Chew (1989)
Chew and Lu (1995)
Chew et al. (1990)
Chew et al. (1994)
Comberg and Wriedt (1999)
Cruz et al. (1989)
de Abajo (1999a)
de Abajo (1999b)
de Daran et al. (1995)
Flatau et al. (1993)
Fonseca et al. (1993)
Fonseca et al. (1994)
Fucile et al. (1995)
Fuller (1991)
Fuller (1995)
Fuller and Kattawar (1988a)
Fuller and Kattawar (1988b)
Fuller et al. (1986)
Fuller et al. (1999)

Gérardy and Ausloos (1982)
Gustafson et al. (2001)
Hamid (1996)
Hamid et al. (1990a)
Hamid et al. (1990b)
Hamid et al. (1991)
Holler et al. (2000)
Hovenier and Mackowski (1998)
Hovenier et al. (1996)
Ioannidou et al. (1995)
Jin and Huang (1996a)
Kattawar and Dean (1983)
Khlebtsov et al. (2000)
Khlebtsov et al. (2004b)
Kimura (2001)
Kimura et al. (2003)
Landgraf et al. (1999)
Litvinov et al. (2003)
Lu and Chew (1993)
Mackowski (1991)
Mackowski (1994)
Mackowski and Mishchenko (1996)
Manoharan et al. (2003)
Mishchenko (1996)
Mishchenko and Mackowski (1994)
Mishchenko and Mackowski (1996)
Mishchenko et al. (1995a)
Mishchenko et al. (2004)
Miyazaki and Jimba (2000)
Miyazaki et al. (2002)
Miyazaki et al. (2003)
Miyazaki et al. (2004)
Ovod (1999)
Ovod et al. (1998)
Pellegrino et al. (1997)
Petrova et al. (2000)
Petrova et al. (2001a)
Petrova et al. (2001b)
Pustovit et al. (2002)
Quinten (1999)
Quinten and Kreibig (1988)
Quinten and Kreibig (1993)
Quinten et al. (2000)
Quinten et al. (2002)
Quirantes and Delgado (2003)
Quirantes et al. (2001)
Ruppin (1999)
Saija et al. (1985)
Saija et al. (2001a)
Saija et al. (2001b)
Saija et al. (2003a)
Saija et al. (2003b)
Schnaiter et al. (2003)
Secker et al. (2000)
Siqueira and Sarabandi (2000)
Stout et al. (2001)
Stout et al. (2002a)
Stout et al. (2002b)
Tishkovets (1994)
Tishkovets (1998)
Tishkovets and Litvinov (1996)
Tishkovets and Litvinov (1999)
Tishkovets et al. (1999)
Tishkovets et al. (2004a)
Tishkovets et al. (2004b)
Tzeng and Fung (1994)
Usami (1999)
Vargas and Niklasson (2001)
Vargas and Niklasson (2002)
Videen et al. (1997a)
Videen et al. (1997b)
Videen et al. (1998)
Videen et al. (2000)
Wang and Chew (1993)
Wurm and Schnaiter (2002)
Xu (1995)
Xu (1997a)
Xu (1998a)
Xu (2003b)
Xu (2003c)
Xu (2004)
Xu and Gustafson (1997)
Xu and Gustafson (1999)
Xu and Gustafson (2001)
Xu and Wang (1998)
Xu et al. (1999)
Zhao et al. (2003)
Zhong et al. (2004)

2.20. T-matrix calculations for clusters of layered spheres

Borghese et al. (1987a)
Hamid et al. (1992)
Hamid et al. (2003)
Khlebtsov et al. (2004b)
Xu and Khlebtsov (2003)

2.21. T-matrix calculations for clusters of nonspherical monomers

Cruz et al. (1989)
Huang and Jin (1998)
Jin and Huang (1996b)
Şahin and Miller (1998)
Vargas et al. (1993)
Xu (2003a)

2.22. T-matrix calculations for particles with one or several (eccentric) inclusions

Auger et al. (2001)
Auger et al. (2004)
Borghese et al. (1992)
Borghese et al. (1994)
Borghese et al. (1998)
Chýlek and Videen (1998)
Chýlek et al. (1996)
Chýlek et al. (1998)
Chýlek et al. (2000)
Doicu and Wriedt (2001a)
Fikioris and Uzunoglu (1979)
Fuller (1995b)
Fuller et al. (1999)
Hill et al. (1997)
Iatì et al. (2001)
Ioannidou and Chrissoulidis (2002)
Ioannidou et al. (1999)
Jones (1995)
Krieger et al. (2003)
Krieger et al. (2004)
Mackowski and Jones (1995)
Ngo and Pinnick (1994)
Ngo et al. (1996)
Pellegrino et al. (1997)
Pinnick et al. (2000)
Prabhu et al. (2001)
Roumeliotis and Fikioris (1981)
Rozenberg (1974)
Skaropoulos et al. (1994)
Schuh and Wriedt (2001)
Secker et al. (2000)
Simão et al. (2001)
Skaropoulos et al. (1996)
Stout et al. (2003)
Videen and Chylek (1998)
Videen and Ngo (1998)
Videen et al. (1994)
Videen et al. (1995)
Videen et al. (1997b)
Videen et al. (2000)
Videen et al. (2001)

2.23. T-matrix calculations of optical resonances in nonspherical particles

Arnold et al. (1994)
Barber and Hill (1988)
Barber and Massoudi (1982)
Barber et al. (1982)
Borghese et al. (1987a)
Borghese et al. (1998)
Fuller (1989)
Fuller (1991)

Fuller (1995b)
Fuller et al. (1986)
Hill and Benner (1988)
Gérardy and Ausloos (1982)
Khlebtsov et al. (1996a)
Khlebtsov et al. (2004a)
Kristensson (1984)
Lai et al. (1991)
Mazumder et al. (1992)
Merchant et al. (1988)
Mishchenko and Lacis (2003)
Miyazaki and Jimba (2000)
Ngo and Pinnick (1994)
Ruppin (1998)
Ruppin (1999)
Simão et al. (2001)
Tzeng et al. (1985)
Überall et al. (1985)
Zhao et al. (2003)
Zheng (1989)
Zheng and Ström (1991)

2.24. *T-matrix calculations of optical forces and torques on small particles*

Bayoudh et al. (2003)
Bishop et al. (2003)
Mishchenko (1991e)
Nieminen et al. (2001a)
Nieminen et al. (2001b)
Saija et al. (2003a)

2.25. *T-matrix calculations of internal, surface, and local fields*

Astafieva and Babenko (1999)
Babenko and Petrov (2002)
Barber (1977b)
Barber et al. (1983a)
Barber et al. (1983b)
Bates and Wong (1974)
Bringi and Seliga (1980)
Cline et al. (1986)
Cruz et al. (1989)
Iskander et al. (1980)
Lakhtakia and Iskander (1983b)
Lakhtakia et al. (1981)
Lakhtakia et al. (1982a)
Lakhtakia et al. (1983)
Lakhtakia et al. (1984c)
Mackowski and Jones (1995)
Nilsson et al. (1998)
Şahin and Miller (1998)
Skaropoulos et al. (1996)
Stout et al. (2002b)
Tishkovets (1998)
Vargas et al. (1993)
Wang et al. (1980)
Waterman (1999)
Xu (2003c)
Xu (2004)

2.26. *Illumination by focused beams and non-plane waves*

Bayoudh et al. (2003)
Bishop et al. (2003)
Doicu and Wriedt (1997a)
Doicu and Wriedt (1997d)
Doicu and Wriedt (1997e)
Lakhtakia et al. (1982a)
Lakhtakia et al. (1982b)
Li et al. (2001)
Nieminen et al. (2003b)
Ovod (1999)
Yeh et al. (1982b)

2.27. Use of T-matrix calculations for testing other theoretical techniques

Andersen et al. (2002)
Andersen et al. (2004)
Babenko and Petrov (2002)
Baran et al. (1998)
Baran et al. (2001b)
Barber and Wang (1978)
Chýlek and Ramaswamy (1982)
Chýlek and Videen (1998)
Comberg and Wriedt (1999)
Doicu et al. (2000b)
Evans and Fournier (1994)
Flatau et al. (1993)
Fournier and Evans (1991)
Gordon et al. (2001)
Goedecke and O'Brien (1988)
Havemann et al. (2003)
Holt (1980)
Holt (1982)
Hovenier and Mackowski (1998)
Hovenier et al. (1996)
Iskander et al. (1989a)
Kahnert et al. (2001a)
Khlebtsov et al. (1991)
Khlebtsov et al. (1994)
Kimura (2001)
Lapalme and Patitsas (1993b)
Latimer and Barber (1978)
Liu et al. (1998)
Lopatin et al. (1987)
Macke et al. (1995)
Mishchenko (1990a)
Mishchenko (1990d)
Mishchenko (1991b)
Mishchenko and Macke (1999)
Mitchell et al. (2001)
Paramonov et al. (1986a)
Paramonov et al. (1986b)
Paramonov et al. (1989)
Peltoniemi (1996)
Petrova and Markiewicz (1997)
Qingan et al. (1998)
Ravey and Mazeron (1983)
Ruppin (1990)
Schulz et al. (1998a)
Seliga and Bringi (1978)
Simão et al. (2001)
Streekstra et al. (1994)
Videen and Chýlek (1998)
Videen et al. (1994)
Voshchinnikov et al. (2000)
Wielaard et al. (1997)
Wriedt and Comberg (1998)
Xu and Gustafson (1999)
Zhao and Hu (2003)
Zhao et al. (2003)

2.28. Comparisons of T-matrix and effective-medium-approximation results

Botet et al. (1997)
Chew (1989)
Chýlek and Videen (1998)
Chýlek et al. (2000)
Doicu and Wriedt (2001a)
Fonseca et al. (1994)
Fuller et al. (1999)
Gustafson et al. (2001)
Neo et al. (1999)
Siqueira and Sarabandi (2000)
Videen and Chýlek (1998)
Videen et al. (1994)
Zurk et al. (1996)

2.29. Comparisons of T-matrix and controlled laboratory results

Arnold et al. (1994)
Borghese et al. (1989)
Bringi and Seliga (1977a)
Bringi and Seliga (1977b)
Bruning and Lo (1971b)
Fuller et al. (1986)
Kattawar and Dean (1983)
Mishchenko and Mackowski (1996)
Qingan et al. (1998)
Ruppin (1990)
Varadan et al. (1983)
West et al. (1994)
Xu (1997a)
Xu (1998a)
Xu and Gustafson (1997)
Xu and Gustafson (1999)
Xu and Gustafson (2001)
Xu and Wang (1998)

2.30. Use of T-matrix calculations for analyzing laboratory data

Balzer and Rubahn (2001)
Balzer et al. (1998)
Bazhan et al. (2002)
Chen et al. (2003)
Crosta et al. (2001)
Crosta et al. (2003)
Doicu et al. (1998)
Fonseca et al. (1993)
Hill et al. (1984)
Holler et al. (1998)
Holler et al. (2000)
Jalava et al. (1998)
Khlebtsov et al. (1994)
Krieger et al. (2003)
Krieger et al. (2004)
Lambert et al. (2003)
Mitchell et al. (2001)
Miyazaki et al. (2002)
Miyazaki et al. (2004)
Ngo and Pinnick (1994)
Nousiainen and Vermeulen (2003)
Pellegrino et al. (1997)
Pinnick et al. (2000)
Pitter et al. (1999)
Quinten and Kreibig (1988)
Quinten et al. (2000)
Quirantes and Delgado (1995a)
Quirantes and Delgado (1995b)
Quirantes and Delgado (1998)
Ryde and Matijević (1994)
Secker et al. (2000)
Varadan et al. (1985a)
Videen et al. (1996)
Videen et al. (1997a)
Videen et al. (1997b)
Videen et al. (2000)
Volten et al. (1999)

2.31. T-matrix modeling of scattering properties of mineral aerosols in the terrestrial atmosphere and soil particles

Dubovik et al. (2002)
Heintzenberg et al. (2002)
Hill et al. (1984)
Kahn et al. (1997)

Kahnert (2004)
Kalashnikova et al. (2005)
Krotkov et al. (1997)
Krotkov et al. (1999)
Lacis and Mishchenko (1995)
Liang and Mishchenko (1997)
Liu et al. (2002)
Mishchenko et al. (1995b)
Mishchenko et al. (1997a)
Müller et al. (2003)
Nousiainen and Vermeulen (2003)
Pilinis and Li (1998)
Reid et al. (2003)
Sakai et al. (2002)
Sakai et al. (2003)
Sinyuk et al. (2003)
Veihelmann et al. (2004)
Wang et al. (2003)

2.32. T-matrix modeling of scattering properties of carbonaceous and soot aerosols and soot-containing aerosol and cloud particles

Abel et al. (2003)
Chylek et al. (1981)
Chýlek et al. (1995)
Chýlek et al. (1996)
Fuller (1995a)
Fuller (1995b)
Fuller et al. (1999)
Khlebtsov and Mel'nikov (1995)
Quinten (1999)
Quinten et al. (2002)
Roessler et al. (1983)
Schnaiter et al. (2003)
Videen and Chýlek (1998)
Videen et al. (1994)

2.33. T-matrix modeling of scattering properties of cirrus cloud particles

Babur et al. (2002)
Bantges et al. (1999)
Baran (2003)
Baran and Francis (2004)
Baran et al. (1998)
Baran et al. (2001a)
Baran et al. (2001b)
Baran et al. (2003)
Battaglia et al. (2001a)
Borrmann et al. (1996)
Borrmann et al. (2000)
Czekala (1998)
Ding and Xu (2002)
Evans et al. (1999)
Francis et al. (1999)
Havemann et al. (2003)
Hogan et al. (2000)
Kahn et al. (2003)
Lee et al. (2003)
Miao et al. (2003)
Mishchenko and Macke (1998)
Mishchenko and Macke (1999)
Mishchenko et al. (1997b)
Mitchell et al. (2001)
Oppel et al. (2002)
Peter et al. (2003)
Prodi et al. (1999)
Saija et al. (2001b)
Sreerekha et al. (2002)
Stubenrauch et al. (1999)
Thomas et al. (2002)
Troitsky et al. (2001)
Troitsky et al. (2003)
Yang et al. (2003)

2.34. T-matrix modeling of scattering properties of hydrometeors

Aydin and Daisley (2002)
Aydin and Lure (1991)
Aydin and Seliga (1984)
Aydin and Walsh (1999)
Aydin and Zhao (1990)
Aydin et al. (1984)
Aydin et al. (1989)
Aydin et al. (1998)
Barksdale and Bostian (1988)
Battaglia et al. (2001b)
Bringi and Chandrasekar (2001)
Bringi and Seliga (1977a)
Bringi et al. (1998)
Carey et al. (2000)
Czekala and Simmer (1998)
Czekala and Simmer (2002)
Czekala et al. (1999)
Czekala et al. (2001a)
Durden (2003)
Gosset (2004)
Haferman (2000)
Hubbert and Bringi (2003)
Ioannidou et al. (1999)
Jain and Watson (1985)
Keenan et al. (2001)
Kennedy et al. (2001)
Kollias et al. (2001)
Kollias et al. (2002)
Kollias et al. (2003)
Kummerow and Weinman (1988)
Mishchenko (1992a)
Prigent et al. (2001)
Prodi et al. (1999)
Qingan et al. (1998)
Roberti and Kummerow (1999)
Rozenberg (1974)
Seliga and Bringi (1978)
Seow et al. (1998)
Sturniolo et al. (1995)
Vivekanandan et al. (1991)
Wang and Barber (1979)
Warner (1975)
Warner and Hizal (1976)
Wiedner et al. (2004)
Yeh et al. (1982a)
Zrnić et al. (2000)

2.35. T-matrix modeling of scattering properties of terrestrial stratospheric aerosol and cloud particles

Brogniez et al. (2003)
Brooks et al. (2004)
Carslaw et al. (1998a)
Carslaw et al. (1998b)
Flentje et al. (2002)
Flesia et al. (1994)
Fueglistaler et al. (2002)
Fueglistaler et al. (2003)
Gerding et al. (2003)
Höpfner et al. (2001)
Hu et al. (2002)
Liu and Mishchenko (2001)
Luo et al. (2003)
Reichardt et al. (2000)
Reichardt et al. (2002)
Toon et al. (1990)
Toon et al. (2000)
Tsias et al. (1999)
Voigt et al. (2003)
Wirth et al. (1999)

2.36. T-matrix modeling of scattering properties of noctilucent cloud particles

Alpers et al. (2001)
Baumgarten et al. (2002)
Mishchenko (1992c)
Zakharova and Mishchenko (2000)
Zakharova and Mishchenko (2001)

2.37. T-matrix modeling of scattering properties of hydrosol particles

Kouzoubov et al. (1998)
Kouzoubov et al. (1999)
Morel et al. (2002)

2.38. T-matrix modeling of scattering properties of aerosol and cloud particles in planetary atmospheres

Dlugach and Mishchenko (2004)
Dlugach and Petrova (2003)
Dlugach et al. (2002a)
Dlugach et al. (2002b)
Mishchenko (1991f)
Petrova (1999a)
Petrova (1999b)
Petrova and Markiewicz (1997)
Rannou et al. (1997)
Wolff and Clancy (2003)
Wong et al. (2004)

2.39. T-matrix modeling of scattering properties of interstellar, interplanetary, and cometary particles

Andersen et al. (2002)
Andersen et al. (2004)
Bonev et al. (2002)
Gledhill and McCall (2000)
Gustafson et al. (2001)
Iatì et al. (2001)
Kerola and Larson (2001)
Kimura (2001)
Kimura et al. (2003)
Kolokolova (2004)
Kolokolova et al. (1997)
Landgraf et al. (1999)
Lucas (2003)
Lumme (2000)
Mishchenko (1989)
Mishchenko (1990c)
Mishchenko (1991b)
Petrova et al. (2000)
Petrova et al. (2001a)
Petrova et al. (2001b)
Porco et al. (2003)
Quinten et al. (2002)
Saija et al. (2001a)
Saija et al. (2003a)
Throop and Esposito (1998)
Tishkovets (1994)
Tishkovets and Litvinov (1999)
Tishkovets et al. (2004b)
Whitney and Wolff (2002)
Wurm and Schnaiter (2002)

2.40. T-matrix computations for industrial and military applications

Appleyard and Davies (2004)
Auger et al. (2003)
Doicu et al. (1998)
Joshi et al. (2003)
Quinten (1999)
Ryde and Matijević (1994)
Vargas (2003)
Vargas et al. (2001)

2.41. T-matrix computations for biomedical applications

Barber (1977b)
Barber (1978)
Enejder et al. (2003)
Holler et al. (2000)
Iskander et al. (1980)
Khlebtsov et al. (1994)
Khlebtsov et al. (1995)
Khlebtsov et al. (1996b)
Khlebtsov et al. (1999a)
Khlebtsov et al. (2002a)
Khlebtsov et al. (2002b)
Khlebtsov et al. (2004b)
Lakhtakia and Iskander (1983a)
Lakhtakia and Iskander (1983b)
Lakhtakia et al. (1981)
Lakhtakia et al. (1982a)
Lakhtakia et al. (1982b)
Lakhtakia et al. (1984c)
Lambert et al. (2003)
Lopatin and Sid'ko (1988)
Massoudi et al. (1982)
Mourant et al. (2002)
Mroczka et al. (2002)
Muttiah (2002)
Nilsson et al. (1998)
Paramonov (1994a)
Shvalov et al. (2000)
Sid'ko et al. (1980)
Skaropoulos et al. (1996)
Videen and Ngo (1998)
Videen et al. (1998)
Wang and Barber (1979)

2.42. T-matrix computations of anisotropic properties of colloids and other disperse media

Baran et al. (2001a)
Borghese et al. (2001)
Czekala (1998)
Fucile et al. (1995)
Huang and Jin (1998)
Jin and Huang (1996b)
Khlebtsov (1998)
Khlebtsov and Melnikov (1998)
Khlebtsov et al. (1991)
Khlebtsov et al. (1992)
Khlebtsov et al. (1999b)
Mishchenko (1990c)
Mishchenko (1991b)
Varadan et al. (1985b)

3. Particles near infinite interfaces

3.1. Seminal publications

Karlsson and Kristensson (1983)
Kristensson (1980)
Kristensson and Ström (1980)
Kristensson and Ström (1982)

3.2. Spherically symmetric particles

Aslan et al. (2005)
Bobbert and Vlieger (1986)
Bobbert et al. (1986)
Bobbert et al. (1988)

Borghese et al. (1997)
de la Peña et al. (1999b)
Fucile et al. (1997b)
González et al. (2001)
Hamid and Hamid (2000)
Hamid and Hamid (2002)
Ishikawa et al. (2000)
Johnson (1992)
Johnson (1994)
Johnson (1996)
Kim et al. (2002)
Kim et al. (2004)
Lazzari et al. (2001)
Lazzari et al. (2002)
Liu et al. (2000a)
Ngo and Videen (1997)
Quinten et al. (1999)
Ruppin (1991)
Videen (1991)
Videen (1993)
Videen (2000)
Videen et al. (1992)
Videen et al. (1993)
Videen et al. (2005)
Wannemacher et al. (1999)
Zvyagin and Goto (1998)

3.3. *Non-spherically symmetric finite particles*

Bobbert and Vlieger (1987)
Bobbert et al. (1987)
Borghese et al. (1995)
Borghese et al. (1997)
Denti et al. (1999a)
Denti et al. (1999b)
Doicu et al. (1999a)
Doicu et al. (2000a)
Doicu et al. (2001)
Germer (2002)
Lazzari et al. (2001)
Lazzari et al. (2002)
Simonsen et al. (2000)
Videen (1995)
Videen (1996)
Videen (1997)
Wind et al. (1987a)
Wind et al. (1987b)
Wind et al. (1988)
Wriedt and Doicu (1998a)
Wriedt and Doicu (2000)

3.4. *Finite particles on incident side of planar interface*

Bobbert and Vlieger (1986)
Bobbert and Vlieger (1987)
Bobbert et al. (1986)
Bobbert et al. (1987)
Bobbert et al. (1988)
Borghese et al. (1995)
Borghese et al. (1997)
de la Peña et al. (1999b)
Denti et al. (1999a)
Denti et al. (1999b)
Doicu et al. (1999a)
Doicu et al. (2000a)
Fucile et al. (1997b)
Germer (2002)
González et al. (2001)
Hamid and Hamid (2000)
Hamid and Hamid (2002)
Johnson (1992)
Johnson (1994)
Johnson (1996)
Kim et al. (2002)
Kim et al. (2004)
Lazzari et al. (2001)
Lazzari et al. (2002)
Ngo and Videen (1997)
Ruppin (1991)
Simonsen et al. (2000)
Videen (1991)

Videen (1995)
Videen (1997)
Videen (2000)
Videen et al. (1992)
Videen et al. (1993)
Wind et al. (1987a)
Wind et al. (1987b)
Wind et al. (1988)
Wriedt and Doicu (1998a)
Wriedt and Doicu (2000)

3.5. Finite particles on transmitted side of planar interface

Aslan et al. (2005)
Doicu et al. (2001)
Ishikawa et al. (2000)
Liu et al. (2000a)
Quinten et al. (1999)
Videen (1993)
Videen (1996)
Videen et al. (2005)
Wannemacher et al. (1999)
Zvyagin and Goto (1998)

3.6. Two-dimensional particles near planar substrates

Borghi et al. (1996a)
Borghi et al. (1996b)
Borghi et al. (1997)
Borghi et al. (1999)
Borghi et al. (2000)
de la Peña et al. (1999a)
Lee (1999)
Lee and Grzesik (1998)
Rao and Barakat (1989)
Rao and Barakat (1991)
Rao and Barakat (1994)
Videen and Ngo (1997)

3.7. Tools for particle characterization

Aslan et al. (2005)
Bobbert and Vlieger (1987)
Bobbert et al. (1986)
Bobbert et al. (1987)
Bobbert et al. (1988)
de la Peña et al. (1999a)
de la Peña et al. (1999b)
Doicu et al. (2001)
Ishikawa et al. (2000)
Johnson (1994)
Kim et al. (2002)
Kim et al. (2004)
Liu et al. (2000a)
Quinten et al. (1999)
Videen (1997)
Wannemacher et al. (1999)
Wind et al. (1987a)
Wind et al. (1987b)
Zvyagin and Goto (1998)

3.8. Convergence of results

de la Peña et al. (1999a)
de la Peña et al. (1999b)
Doicu et al. (1999a)
González et al. (2001)
Johnson (1996)
Videen et al. (1992)
Videen et al. (1993)

3.9. Resonances

Borghese et al. (1997)
Ishikawa et al. (2000)
Johnson (1994)
Lazzari et al. (2002)
Liu et al. (2000a)
Quinten et al. (1999)
Wannemacher et al. (1999)

3.10. Normally incident interaction-field approximation

de la Peña et al. (1999a)
de la Peña et al. (1999b)
Johnson (1994)
Johnson (1996)
Kim et al. (2002)
Ngo and Videen (1997)
Videen (1991)
Videen (1993)
Videen (1995)
Videen (1996)
Videen and Ngo (1997)
Videen et al. (1992)
Videen et al. (1993)

Acknowledgements

We thank Nadia Zakharova for excellent editorial work and Josefina Mora and Zoe Wai for helping to obtain copies of publications that were not readily accessible. We also appreciate useful comments by Anthony Baran and Michael Kahnet. This project was sponsored by the NASA Radiation Sciences Program managed by Donald Anderson.

References

Abdulkin VV, Paramonov LE. Application of orthogonal polynomials to estimation of scattering coefficients of polydisperse randomly oriented spheroidal particles. Atmos Oceanic Opt 2001;14:543–4.

Abel SJ, Haywood JM, Highwood EJ, Li J, Buseck PR. Evolution of biomass burning aerosol properties from an agricultural fire in southern Africa. Geophys Res Lett 2003;30:1783.

Agarwal GS. Relation between Waterman's extended boundary condition and the generalized extinction theorem. Phys Rev D 1976;14:1168–71.

Al-Badwaihy KA, Yen JL. Extended boundary conditions integral equations for perfectly conducting and dielectric bodies: formulation and uniqueness. IEEE Trans Antennas Propag 1975;23:546–51.

Alpers M, Gerding M, Höffner J, Schneider J. Multiwavelength lidar observation of a strange noctilucent cloud at Kühlungsborn, Germany (54°N). J Geophys Res 2001;106:7945–53.

Andersen AC, Sotelo JA, Pustovit VN, Niklasson GA. Extinction calculations of multi-sphere polycrystalline graphitic clusters. Astron Astrophys 2002;386:296–307.

Andersen AC, Sotelo JA, Niklasson GA, Pustovit VN. Extinction properties of some complex dust grains. In: Witt AN, Clayton GC, Draine BT., editors. Astrophysics of dust. San Francisco: ASP Press; 2004. p. 709–29.

Appleyard PG, Davies N. Calculation and measurement of infrared mass extinction coefficients of selected ionic and partially ionic insulators and semiconductors: a guide for infrared obscuration applications. Opt Eng 2004;43:376–86.

Arnold S, Ghaemi A, Hendrie P, Fuller KA. Morphological resonances detected from a cluster of two microspheres. Opt Lett 1994;19:156–8.

Aslan MM, Mengüç MP, Videen G. Characterization of metallic nano-particles via surface wave scattering: B. Physical concept and numerical experiments. JQSRT 2005;93:207–17.

Astafieva LG, Babenko VA. Heating of a spheroidal particle by intense laser radiation. JQSRT 1999;63:459–68.
Auger J-C, Stout B. A recursive centered T-matrix algorithm to solve the multiple scattering equation: numerical validation. JQSRT 2003;79/80:533–47.
Auger J-C, Stout B, Lafait J. Dependent light scattering in dense heterogeneous media. Physica B 2000;279:21–4.
Auger J-C, Stout B, Barrera RG, Curiel F. Scattering properties of rutile pigments located eccentrically within microvoids. JQSRT 2001;70:675–95.
Auger J-C, Barrera RG, Stout B. Scattering efficiency of clusters composed by aggregated spheres. JQSRT 2003;79/80:521–31.
Auger J-C, Barrera RG, Stout B. Optical properties of an eccentrically located pigment within an air bubble. Progr Org Coat 2004;49:74–83.
Aydin K, Daisley SEA. Relationships between rainfall rate and 35-GHz attenuation and differential attenuation: modeling the effects of raindrop size distribution, canting, and oscillation. IEEE Trans Geosci Remote Sens 2002;40:2343–52.
Aydin K, Hizal A. On the convergence of the spherical vector wave function expansions used in electromagnetic scattering problems. Antennas Propag Soc Int Symp 1979;17:429–32.
Aydin K, Lure Y-M. Millimeter wave scattering and propagation in rain: a computational study at 94 and 140 GHz for oblate spheroidal and spherical raindrops. IEEE Trans Geosci Remote Sens 1991;29:593–601.
Aydin K, Seliga TA. Radar polarimetric backscattering properties of conical graupel. J Atmos Sci 1984;41:1887–92.
Aydin K, Walsh TM. Millimeter wave scattering from spatial and planar bullet rosettes. IEEE Trans Geosci Remote Sens 1999;37:1138–50.
Aydin K, Zhao Y. A computational study of polarimetric radar observables in hail. IEEE Trans Geosci Remote Sens 1990;28: 412–22.
Aydin K, Altintas A, Hizal A. Null field formulations for dielectric-coated antennas. Radio Sci 1983;18:1225–42.
Aydin K, Seliga TA, Bringi VN. Differential radar scattering properties of model hail and mixed-phase hydrometeors. Radio Sci 1984;19:58–66.
Aydin K, Zhao Y, Seliga TA. Rain-induced attenuation effects on C-band dual-polarization meteorological radars. IEEE Trans Geosci Remote Sens 1989;27:57–66.
Aydin K, Park SH, Walsh TM. Bistatic dual-polarization scattering from rain and hail at S- and C-band frequencies. J Atmos Oceanic Technol 1998;15:1110–21.
Babenko VA. Improved algorithm for T-matrix computations of light scattering by aerosol spheroidal particles. J Aerosol Sci 1997;28:S203–4.
Babenko VA. A new method of T-matrix calculations of scattering and absorption of light by spheroidal particles. Vestsi Natl Acad Sci Belarus 1999;2:77–82.
Babenko VA, Petrov PK. Calculation of optical fields inside spheroidal particles of cosmic dust: comparison of different methods: GMT, T-matrix SVM. In: Videen G, Kocifaj M., editors. Optics of cosmic dust. The Netherlands, Dordrecht: Kluwer Academic Publishers; 2002. p. 119–30.
Babenko VA, Astafyeva LG, Kuzmin VN. Electromagnetic scattering in disperse media. Inhomogeneous and anisotropic particles. Chichester, UK: Praxis; 2003.
Babur Y, Yilmaz S, Mamedov AM. Formation dynamic of clouds and Mie scattering theory. Balkan Phys Lett 2002;10:146–54.
Balzer F, Rubahn H-G. Second-harmonic generation and shielding effects of alkali clusters on ultrathin organic films. Nanotechnol 2001;12:105–9.
Balzer F, Jett SD, Rubahn H-G. Alkali cluster films on insulating substrates: comparison between scanning force microscopy and extinction data. Chem Phys Lett 1998;297:273–80.
Bantges RJ, Russell JE, Haigh JD. Cirrus cloud top-of-atmosphere radiance spectra in the thermal infrared. JQSRT 1999;63: 487–98.
Baran AJ. Simulation of infrared scattering from ice aggregates by use of a size-shape distribution of circular ice cylinders. Appl Opt 2003;42:2811–8.
Baran AJ, Francis PN. On the radiative properties of cirrus cloud at solar and thermal wavelengths: a test of model consistency using high-resolution airborne radiance measurements. Quart J R Meteorol Soc 2004;130:763–78.
Baran AJ, Foot JS, Mitchell DL. Ice-crystal absorption: a comparison between theory and implications for remote sensing. Appl Opt 1998;37:2207–15.
Baran AJ, Francis PN, Havemann S, Yang P. A study of the absorption and extinction properties of hexagonal ice columns and plates in random and preferred orientations using exact T-matrix theory and aircraft observations of cirrus. JQSRT 2001a;70:505–18.

Baran AJ, Yang P, Havemann S. Calculation of the single-scattering properties of randomly oriented hexagonal ice columns: a comparison of the T-matrix and the finite-difference time-domain methods. Appl Opt 2001b;40:4376–86.

Baran AJ, Havemann S, Francis PN, Watts PD. A consistent set of single-scattering properties for cirrus cloud: tests using radiance measurements from a dual-viewing multi-wavelength satellite-based instrument. JQSRT 2003;79/80:549–67.

Barber PW. Resonance electromagnetic absorption by nonspherical dielectric objects. IEEE Trans Microwave Theory Tech 1977a;25:373–81.

Barber PW. Electromagnetic power deposition in prolate spheroid models of man and animals at resonance. IEEE Trans Biomed Eng 1977b;24:513–21.

Barber PW. Scattering and absorption efficiencies for nonspherical dielectric objects—biological models. IEEE Trans Biomed Eng 1978;25:155–9.

Barber PW. Scattering and absorption by homogeneous and layered dielectrics. In: Varadan VK, Varadan VV., editors. Acoustic electromagnetic and elastic wave scattering—focus on the T-matrix approach. New York: Pergamon Press; 1980. p. 191–209.

Barber PW, Hill SC. Effects of particle nonsphericity on light-scattering. In: Gouesbet G, Gréhan G., editors. Optical particle sizing. Theory and practice. New York: Plenum Press; 1988. p. 43–53.

Barber PW, Hill SC. Light scattering by particles: computational methods. Singapore: World Scientific; 1990.

Barber PW, Massoudi H. Recent advances in light scattering calculations for nonspherical particles. Aerosol Sci Technol 1982;1:303–15.

Barber PW, Wang D-S. Rayleigh–Gans–Debye applicability to scattering by nonspherical particles. Appl Opt 1978;17:797–803 (Corrigenda: 1979;18:962–3).

Barber P, Yeh C. Scattering of electromagnetic waves by arbitrarily shaped dielectric bodies. Appl Opt 1975;14:2864–72.

Barber PW, Wang D-SY, Long MB. Scattering calculations using a microcomputer. Appl Opt 1981;7:1121–3.

Barber PW, Owen JF, Chang RK. Resonant scattering for characterization of axisymmetric dielectric objects. IEEE Trans Antennas Propag 1982;30:168–72.

Barber PW, Chang RK, Massoudi H. Surface-enhanced electric intensities on large silver spheroids. Phys Rev Lett 1983a;50: 997–1000.

Barber PW, Chang RK, Massoudi H. Electrodynamic calculations of the surface-enhanced electric intensities on large Ag spheroids. Phys Rev B 1983b;27:7251–61.

Barksdale Jr HH, Bostian CW. Attenuation and depolarization due to rain scatter at millimeter wave frequencies. IEEE Trans Antennas Propag 1988;36:1033–40.

Bates RHT. Rayleigh hypothesis, the extended-boundary condition and point matching. Electron Lett 1969;5:654–5.

Bates RHT. Analytic constraints on electromagnetic field computations. IEEE Trans Microwave Theory Tech 1975;23:605–23.

Bates RHT, Wong CT. Extended boundary condition and thick axially symmetric antennas. Appl Sci Res 1974;29:19–43.

Bates RHT, Wall DJN. Null field approach to scalar diffraction. Phil Trans Roy Soc London A 1977;287:45–114.

Battaglia A, Sturniolo O, Prodi F. Analysis of polarization radar returns from ice clouds. Atmos Res 2001a;59/60:231–50.

Battaglia A, Prodi F, Sturniolo O. Radar and scattering parameters through falling hydrometeors with axisymmetric shapes. Appl Opt 2001b;40:3092–100.

Baumgarten G, Fricke KH, von Cossart G. Investigation of the shape of noctilucent cloud particles by polarization lidar technique. Geophys Res Lett 2002;29 (doi:10.1029/2001GL013877).

Bayoudh S, Nieminen TA, Heckenberg NR, Rubinsztein-Dunlop H. Orientation of biological cells using plane-polarized Gaussian beam optical tweezers. J Mod Opt 2003;50:1581–90.

Bazhan W, Kolwas K, Kolwas M. Depolarization of light scattered by a single sodium nanoparticle trapped in an electro-optical trap. Opt Commun 2002;211:171–81.

Bishop AI, Nieminen TA, Heckenberg NR, Rubinsztein-Dunlop H. Optical application and measurement of torque on microparticles of isotropic nonabsorbing material. Phys Rev A 2003;68:033802.

Björkberg J, Kristensson G. Electromagnetic scattering by a perfectly conducting elliptic disk. Can J Phys 1987;65:723–34.

Bobbert PA, Vlieger J. Light scattering by a sphere on a substrate. Physica A 1986;137:209–42.

Bobbert PA, Vlieger J. The polarizability of a spheroidal particle on a substrate. Physica A 1987;147:115–41.

Bobbert PA, Vlieger J, Greef R. Light reflection from a substrate sparsely seeded with spheres–comparison with an ellipsometric experiment. Physica A 1986;137:243–57.

Bobbert PA, Wind MM, Vlieger J. Diffusion to a slowly growing truncated sphere on a substrate. Physica A 1987;141:58–72.

Bobbert PA, Vlieger J, Greef R. Theory of light reflection from a substrate sparsely seeded with spheres: comparison with an ellipsometric experiment. Thin Solid Films 1988;164:63–7.

Bolomey JC, Wirgin A. Numerical comparison of the Green's function and the Waterman and Rayleigh theories of scattering from a cylinder with arbitrary cross-section. Proc IEE 1974;121:794–804.

Bonev T, Jockers K, Petrova E. et al. The dust in comet C/1999 S4 (LINEAR) during its disintegration: narrow-band images, color maps, and dynamical models. Icarus 2002;160:419–36.

Borghese F, Denti P, Toscano G, Sindoni OI. Electromagnetic scattering by a cluster of spheres. Appl Opt 1979;18:116–20.

Borghese F, Denti P, Toscano G, Sindoni OI. An addition theorem for vector Helmholtz harmonics. J Math Phys 1980;21: 2754–5.

Borghese F, Denti P, Saija R. et al. Macroscopic optical constants of a cloud of randomly oriented nonspherical scatterers. Nuovo Cim B 1984a;81:29–50.

Borghese F, Denti P, Saija R. et al. Use of group theory for the description of electromagnetic scattering from molecular systems. J Opt Soc Am A 1984b;1:183–91.

Borghese F, Denti P, Saija R. et al. Multiple electromagnetic scattering from a cluster of spheres. I. Theory. Aerosol Sci Technol 1984c;3:227–35.

Borghese F, Denti P, Saija R. et al. Extinction coefficients for a random dispersion of small stratified spheres and a random dispersion of their binary aggregates. J Opt Soc Am A 1987a;4:1984–91.

Borghese F, Denti P, Saija R, Toscano G. Optical absorption coefficient of a dispersion of clusters composed of a large number of spheres. Aerosol Sci Technol 1987b;6:173–81.

Borghese F, Denti P, Saija R, Sindoni OI. Reliability of the theoretical description of electromagnetic scattering from nonspherical particles. J Aerosol Sci 1989;20:1079–81.

Borghese F, Denti P, Saija R, Sindoni OI. Optical properties of spheres containing a spherical eccentric inclusion. J Opt Soc Am A 1992;9:1327–35.

Borghese F, Denti P, Saija R. Optical properties of spheres containing several spherical inclusions. Appl Opt 1994;33:484–93 (Errata: 1995;34:555–6).

Borghese F, Denti P, Saija R. et al. Optical properties of model anisotropic particles on or near a perfectly reflecting surface. J Opt Soc Am A 1995;12:530–40.

Borghese F, Denti P, Saija R. et al. Resonance suppression in the extinction spectrum of single and aggregated hemispheres on a reflecting surface. Appl Opt 1997;36:4226–34.

Borghese F, Denti P, Saija R. et al. Optical resonances of spheres containing an eccentric spherical inclusion. J Opt 1998;29: 28–34.

Borghese F, Denti P, Saija R. et al. Optical properties of a dispersion of anisotropic particles with non-randomly distributed orientations. The case of atmospheric ice crystals. JQSRT 2001;70:237–51.

Borghese F, Denti P, Saija R. Scattering from model nonspherical particles. Theory and applications to environmental physics. Berlin: Springer-Verlag; 2003.

Borghi R, Gori F, Santarsiero M. et al. Plane-wave scattering by a set of perfectly conducting circular cylinders in the presence of a plane surface. J Opt Soc Am A 1996a;13:2441–52.

Borghi R, Gori F, Santarsiero M. et al. Plane-wave scattering by a perfectly conducting circular cylinder near a plane surface: cylindrical-wave approach. J Opt Soc Am A 1996b;13:483–93.

Borghi R, Santarsiero M, Frezza F, Schettini G. Plane-wave scattering by a dielectric circular cylinder parallel to a general reflecting flat surface. J Opt Soc Am A 1997;14:1500–4.

Borghi R, Frezza F, Santini C. et al. Numerical study of the reflection of cylindrical waves of arbitrary order by a generic planar interface. J Electromagn Waves Appl 1999;13:27–50.

Borghi R, Frezza F, Santarsiero M, Schettini G. Electromagnetic scattering by cylindrical objects on generic planar substrates: cylindrical-wave approach. In: Moreno F, González F., editors. Light scattering from microstructures. Berlin: Springer; 2000. p. 97–111.

Borrmann S, Solomon S, Dye JE, Luo B. The potential of cirrus clouds for heterogeneous chlorine activation. Geophys Res Lett 1996;23:2133–6.

Borrmann S, Luo B, Mishchenko M. Application of the T-matrix method to the measurement of aspherical (ellipsoidal) particles with forward scattering optical particle counters. J Aerosol Sci 2000;31:789–99.

Boström A. Time-dependent scattering by a bounded obstacle in three dimensions. J Math Phys 1982;23:1444–50.

Boström A, Kristensson G, Ström S. Transformation properties of plane, spherical and cylindrical scalar and vector wave functions. In: Varadan VV, Lakhtakia A, Varadan VK., editors. Field representations and introduction to scattering. Amsterdam: North Holland; 1991. p. 165–210.

Botet R, Rannou P, Cabane M. Mean-field approximation of Mie scattering by fractal aggregates of identical spheres. Appl Opt 1997;36:8791–7.

Bringi VN, Chandrasekar V. Polarimetric Doppler weather radar: principles and applications. Cambridge, UK: Cambridge University Press; 2001.

Bringi VN, Seliga TA. Scattering from non-spherical hydrometers. Ann Télécommun 1977a;32:392–7.

Bringi VN, Seliga TA. Scattering from axisymmetric dielectrics or perfect conductors imbedded in an axisymmetric dielectric. IEEE Trans Antennas Propag 1977b;25:575–80.

Bringi VN, Seliga TA. Surface currents and 'near' zone fields. In: Varadan VK, Varadan VV., editors. Acoustic electromagnetic and elastic wave scattering—focus on the T-matrix approach. New York: Pergamon Press; 1980. p. 79–90.

Bringi VN, Varadan VV, Varadan VK. The effects on pair correlation function of coherent wave attenuation in discrete random media. IEEE Trans Antennas Propag 1982a;30:805–8.

Bringi VN, Varadan VV, Varadan VK. Coherent wave attenuation by a random distribution of particles. Radio Sci 1982b;17: 946–52.

Bringi VN, Varadan VK, Varadan VV. Average dielectric properties of discrete random media using multiple scattering theory. IEEE Trans Antennas Propag 1983;31:371–5.

Bringi VN, Chandrasekar V, Xiao R. Raindrop axis ratios and size distributions in Florida rainshafts: an assessment of multiparameter radar algorithms. IEEE Trans Geosci Remote Sens 1998;36:703–15.

Brogniez C, Huret N, Eckermann S. et al. Polar stratospheric cloud microphysical properties measured by the microRADIBAL instrument on 25 January 2000 above Esrange and modeling interpretation. J Geophys Res 2003;108:8332.

Brooks SD, Toon OB, Tolbert MA. et al. Polar stratospheric clouds during SOLVE/THESEO: comparison of lidar observations with in situ measurements. J Geophys Res 2004;109:D02212.

Bruning JH, Lo YT. Multiple scattering of EM waves by spheres. I. Multipole expansion and ray-optical solutions. IEEE Trans Antennas Propag 1971a;19:378–90.

Bruning JH, Lo YT. Multiple scattering of EM waves by spheres. II. Numerical and experimental results. IEEE Trans Antennas Propag 1971b;19:391–400.

Burrows ML. Equivalence of the Rayleigh solution and the extended-boundary-condition solution for scattering problems. Electron Lett 1969;5:277–8.

Carey LD, Rutledge SA, Ahijevych DA, Keenan TD. Correcting propagation effects in C-band polarimetric radar observations of tropical convection using differential propagation phase. J Appl Meteorol 2000;39:1405–33.

Carslaw KS, Wirth M, Tsias A. et al. Increased stratospheric ozone depletion due to mountain-induced atmospheric waves. Nature 1998a;391:675–8.

Carslaw KS, Wirth M, Tsias A. et al. Particle microphysics and chemistry in remotely observed mountain polar stratospheric clouds. J Geophys Res 1998b;103:5785–96.

Chang PCY, Hopcraft KI, Jakeman E, Walker JG. Optimum configuration for polarization photon correlation spectroscopy. Meas Sci Technol 2002;13:341–8.

Chen C-T, Tsang L, Guo J. et al. Frequency dependence of scattering and extinction of dense media based on three-dimensional simulations of Maxwell's equations with applications to snow. IEEE Trans Geosci Remote Sens 2003;41:1844–52.

Chew WC. An N^2 algorithm for the multiple scattering solution of N scatterers. Microwave Opt Technol Lett 1989;2:380–3.

Chew WC. A derivation of the vector addition theorem. Microwave Opt Technol Lett 1990;3:256–60.

Chew WC. Waves and fields in inhomogeneous media. New York: IEEE Press; 1995.

Chew WC, Lu CC. The recursive aggregate interaction matrix algorithm for multiple scatterers. IEEE Trans Antennas Propag 1995;43:1483–6.

Chew WC, Wang YM. Efficient ways to compute the vector addition theorem. J Electromagn Waves Appl 1993;7:651–65.

Chew WC, Friedrich JA, Geiger R. A multiple scattering solution for the effective permittivity of a sphere mixture. IEEE Trans Geosci Remote Sens 1990;28:207–14.

Chew WC, Lu CC, Wang YM. Efficient computation of three-dimensional scattering of vector electromagnetic waves. J Opt Soc Am A 1994;11:1528–37.

Chýlek P, Ramaswamy V. Lower and upper bounds on extinction cross sections of arbitrarily shaped strongly absorbing or strongly reflecting nonspherical particles. Appl Opt 1982;21:4339–44.

Chýlek P, Videen G. Scattering by a composite sphere and effective medium approximations. Opt Commun 1998;146:15–20.
Chylek P, Ramaswamy V, Cheng R, Pinnick RG. Optical properties and mass concentration of carbonaceous smokes. Appl Opt 1981;20:2980–5.
Chýlek P, Videen G, Ngo D. et al. Effect of black carbon on the optical properties and climate forcing of sulfate aerosols. J Geophys Res 1995;100:16325–32.
Chýlek P, Lesins GB, Videen G. et al. Black carbon and absorption of solar radiation by clouds. J Geophys Res 1996;101: 23365–71.
Chýlek P, Videen G, Ngo D. Effect of air bubbles on absorption of solar radiation by water droplets. J Atmos Sci 1998;55: 340–3.
Chýlek P, Videen G, Geldart DJW. et al. Effective medium approximations for heterogeneous particles. In: Mishchenko MI, Hovenier JW, Travis LD., editors. Light scattering by nonspherical particles: theory, measurements, and applications. San Diego: Academic Press; 2000. p. 273–308.
Cline MP, Barber PW, Chang RK. Surface-enhanced electric intensities on transition- and noble-metal spheroids. J Opt Soc Am B 1986;3:15–21.
Comberg U, Wriedt T. Comparison of scattering calculations for aggregated particles based on different models. JQSRT 1999;63:149–62.
Cooper DE, Wang D-S, Kerker M. Scattering of light by laser fusion targets with small defects. Appl Opt 1983;22:83–94.
Crosta GF, Camatini MC, Zomer S. et al. Optical scattering (*TAOS*) by tire debris particles: preliminary results. Opt Express 2001;8:302–7.
Crosta GF, Zomer S, Pan Y-L, Holler S. Classification of single-particle two-dimensional angular optical scattering patterns and heuristic scatterer reconstruction. Opt Eng 2003;42:2689–701.
Cruz L, Fonseca LF, Gómez M. T-matrix approach for the calculation of local fields in the neighborhood of small clusters in the electrodynamic regime. Phys Rev B 1989;40:7491–500.
Cruzan OR. Translational addition theorems for spherical vector wave functions. Quart Appl Math 1962;20:33–40.
Czekala H. Effects of ice particle shape and orientation on polarized microwave radiation for off-nadir problems. Geophys Res Lett 1998;25:1669–72.
Czekala H, Simmer C. Microwave radiative transfer with nonspherical precipitating hydrometeors. JQSRT 1998;60:365–74.
Czekala H, Simmer C. On precipitation induced polarization of microwave radiation measured from space. Meteorol Z 2002;11: 49–60.
Czekala H, Havemann S, Schmidt K. et al. Comparison of microwave radiative transfer calculations obtained with three different approximations of hydrometeor shape. JQSRT 1999;63:545–58.
Czekala H, Crewell S, Simmer C, Thiele A. Discrimination of cloud and rain liquid water path by groundbased polarized microwave radiometry. Geophys Res Lett 2001a;28:267–70.
Czekala H, Crewell S, Simmer C. et al. Interpretation of polarization features in ground-based microwave observations as caused by horizontally aligned oblate raindrops. J Appl Meteorol 2001b;40:1918–32.
Dallas AG. On the convergence and numerical stability of the second Waterman scheme for approximation of the acoustic field scattered by a hard object. Technical Report 2000-7, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716, 2000.
Danos M, Maximon LC. Multipole matrix elements of the translation operator. J Math Phys 1965;6:766–78.
de Abajo FJG. Interaction of radiation and fast electrons with clusters of dielectrics: a multiple scattering approach. Phys Rev Lett 1999a;82:2776–9.
de Abajo FJG. Multiple scattering of radiation in clusters of dielectrics. Phys Rev B 1999b;60:6086–102.
de Daran F, Vignéras-Lefebvre V, Parneix JP. Modeling of electromagnetic waves scattered by a system of spherical particles. IEEE Trans Magn 1995;31:1598–601.
de la Peña JL, Saiz JM, Videen G. et al. Scattering from particles on surfaces: visibility factor and polydispersity. Opt Lett 1999a;24:1451–3.
de la Peña JL, Saiz JM, Valle PJ. et al. Enhanced backscatter from monodisperse contaminants on a substrate. JQSRT 1999b;63: 383–92.
Denti P, Borghese F, Saija R. et al. Optical properties of a dispersion of randomly oriented identical aggregates of spheres deposited on a plane surface. Appl Opt 1999a;38:6421–30.
Denti P, Borghese F, Saija R. et al. Optical properties of aggregated spheres in the vicinity of a plane surface. J Opt Soc Am A 1999b;16:167–75.

Ding J, Xu L. Convergence of the T-matrix approach for randomly oriented nonabsorbing nonspherical Chebyshev particles. JQSRT 1999;63:163–74.

Ding J, Xu L. Light scattering characteristics of small ice circular cylinders in visible, 1.38-μm, and some infrared wavelengths. Opt Eng 2002;41:2252–66.

Dlugach JM, Mishchenko MI. The effect of particle shape on microphysical properties of Jovian aerosols retrieved from ground-based spectropolarimetric observations, JQSRT 2004;88:37–46.

Dlugach ZhM, Petrova EV. Polarimetry of Mars in high-transparency periods: how reliable are the estimates of aerosol optical properties?. Solar Syst Res 2003;37:87–100.

Dlugach ZhM, Mishchenko MI, Morozhenko AV. Effect of the shape of particles on the estimates of optical parameters for the dust component in the Martian atmosphere. Kinem Phys Celest Bodies 2002a;18:33–42.

Dlugach ZhM, Mishchenko MI, Morozhenko AV. The effect of the shape of dust aerosol particles in the Martian atmosphere on the particle parameters. Solar Syst Res 2002b;36:367–73.

Doicu A. Null-field method with discrete sources. In: Wriedt T., editor. Generalized multipole techniques for electromagnetic and light scattering. Amsterdam: Elsevier; 1999. p. 229–53.

Doicu A. Null-field method with circularly distributed spherical vector wave functions. Opt Commun 2002;213:21–5.

Doicu A. Null-field method to electromagnetic scattering from uniaxial anisotropic particles. Opt Commun 2003;218:11–7.

Doicu A, Wriedt T. Formulations of the extended boundary condition method for incident Gaussian beams using multiple-multipole expansions. J Mod Opt 1997a;44:785–801.

Doicu A, Wriedt T. Multiple multipole extended boundary condition method. Optik 1997b;105:57–60.

Doicu A, Wriedt T. Extended boundary condition method with multipole sources located in the complex plane. Opt Commun 1997c;139:85–91.

Doicu A, Wriedt T. Computation of the beam-shape coefficients in the generalized Lorenz–Mie theory by using the translational addition theorem for spherical vector wave functions. Appl Opt 1997d;36:2971–8.

Doicu A, Wriedt T. Plane wave spectrum of electromagnetic beams. Opt Commun 1997e;136:114–24.

Doicu A, Wriedt T. Calculation of the T matrix in the null-field method with discrete sources. J Opt Soc Am A 1999;16: 2539–44.

Doicu A, Wriedt T. Equivalent refractive index of a sphere with multiple spherical inclusions. J Opt A: Pure Appl Opt 2001a;3: 204–9.

Doicu A, Wriedt T. Null-field method with discrete sources to electromagnetic scattering from composite objects. Opt Commun 2001b;190:13–7.

Doicu A, Wriedt T. Null-field method with discrete sources to electromagnetic scattering from layered scatterers. Comput Phys Commun 2001c;138:136–42.

Doicu A, Wriedt T. T-matrix method for electromagnetic scattering from scatterers with complex structure. JQSRT 2001d;70: 663–73.

Doicu A, Wriedt T, Bauckhage K. Light scattering by homogeneous axisymmetric particles for PDA calculations to measure both axes of spheroidal particles. Part Part Syst Charact 1997;14:3–11.

Doicu A, Köser J, Wriedt T, Bauckhage K. Light scattering simulation and measurement of monodisperse spheroids using a phase Doppler anemometer. Part Part Syst Charact 1998;15:257–62.

Doicu A, Eremin Y, Wriedt T. Convergence of the T-matrix method for light scattering from a particle on or near a surface. Opt Commun 1999a;159:266–77.

Doicu A, Eremin YuA, Wriedt T. Projection schemes in the null field method. JQSRT 1999b;63:175–89.

Doicu A, Eremin Yu, Wriedt T. Non-axisymmetric models for light scattering from a particle on or near a plane surface. Opt Commun 2000a;182:281–8.

Doicu A, Eremin YuA, Wriedt T. T- and D-matrix methods for electromagnetic scattering by impedance obstacles. Comput Phys Commun 2000b;124:19–27.

Doicu A, Eremin YuA, Wriedt T. Acoustic and electromagnetic scattering analysis using discrete sources. San Diego: Academic Press; 2000c.

Doicu A, Eremin Yu, Wriedt T. Scattering of evanescent waves by a particle on or near a plane surface. Comput Phys Commun 2001;134:1–10.

Dubovik O, Holben BN, Lapyonok T. et al. Non-spherical aerosol retrieval method employing light scattering by spheroids. Geophys Res Lett 2002;29 doi:10.1029/2001GL014506.

Durden SL. Aiborne polarimetric radar measurements of rainfall profiles. IEEE Trans Geosci Remote Sens 2003;41:2125–7.

Enejder AM, Swartling J, Aruna P, Andersson-Engels S. Influence of cell shape and aggregate formation on the optical properties of flowing whole blood. Appl Opt 2003;42:1384–94.

Eremin YuA. Dissipative matrices in functional representations for wave fields. Differ Equations 1995;31:1540–3.

Eremin YuA. Justification of generalized schemes of the T-matrix method on the base of integral transformations. Differ Equations 1998;34:1255–60.

Eremina E, Wriedt T. Review of light scattering by fiber particles with a high aspect ratio. Recent Res Devel Opt 2003;3: 297–318.

Evans BTN, Fournier GR. Analytic approximation to randomly oriented spheroid extinction. Appl Opt 1994;33:5796–804.

Evans KF, Evans AH, Nolt IG, Marshall BT. The prospect for remote sensing of cirrus clouds with a submillimeter-wave spectrometer. J Appl Meteorol 1999;38:514–25.

Farafonov VG. Applicability of the T-matrix method and its modifications. Opt Spectrosc 2002;92:748–60.

Farafonov VG, Il'in VB, Prokopjeva MS. Light scattering by multilayered nonspherical particles: a set of methods. JQSRT 2003;79–80:599–626.

Fikioris JG, Uzunoglu NK. Scattering from an eccentrically stratified dielectric sphere. J Opt Soc Am 1979;69:1359–66.

Flatau PJ, Fuller KA, Mackowski DW. Scattering by two spheres in contact: comparisons between the discrete dipole approximation and modal analysis. Appl Opt 1993;32:3302–5.

Flentje H, Dörnbrack A, Fix A. et al. Denitrification inside the stratospheric vortex in the winter of 1999–2000 by sedimentation of large nitric acid trihydrate particles. J Geophys Res 2002;107 (doi:10.1029/2001JD001015).

Flesia C, Mugnai A, Emery Y. et al. Interpretation of lidar depolarization measurements of the Pinatubo stratospheric aerosol layer during EASOE. Geophys Res Lett 1994;21:1443–6.

Fonseca L, Cruz L, Vargas W, Gomez M. Theoretical calculation of the optical absorption of fractal colloidal aggregates using a multiple scattering formalism. Cond Matter Theor 1993;8:561–71.

Fonseca LF, Gomez M, Cruz L. Calculation of the aggregation and electrodynamic effects in granular systems. Physica A 1994;207:123–30.

Fournier GR, Evans BTN. Approximation to extinction efficiency for randomly oriented spheroids. Appl Opt 1991;30:2042–8.

Francis PN, Foot JS, Baran AJ. Aircraft measurements of the solar and infrared radiative properties of cirrus and their dependence on ice crystal shape. J Geophys Res 1999;104:31685–95.

Fucile E, Borghese F, Denti P, Saija R. Theoretical description of dynamic light scattering from an assembly of large axially symmetric particles. J Opt Soc Am A 1993;10:2611–7.

Fucile E, Borghese F, Denti P, Saija R. Effect of an electrostatic field on the optical properties of a cloud of dielectric particles. Appl Opt 1995;34:4552–62.

Fucile E, Denti P, Borghese F. et al. Optical properties of a sphere in the vicinity of a plane surface. J Opt Soc Am A 1997;14: 1505–14.

Fueglistaler S, Luo BP, Buss S. et al. Large NAT particle formation by mother clouds: analysis of SOLVE/THESEO-2000 observations. Geophys Res Lett 2002;29 (doi:10.1029/2001GL014548).

Fueglistaler S, Buss S, Luo BP. et al. Detailed modeling of mountain wave PSCs. Atmos Chem Phys 2003;3:697–712.

Fuller KA. Some novel features of morphology dependent resonances of bispheres. Appl Opt 1989;28:3788–90.

Fuller KA. Optical resonances and two-sphere systems. Appl Opt 1991;30:4716–31.

Fuller KA. Scattering and absorption cross sections of compounded spheres. I. Theory for external aggregation. J Opt Soc Am A 1994;11:3251–60.

Fuller KA. Scattering and absorption cross sections of compounded spheres. II. Calculations for external aggregation. J Opt Soc Am A 1995a;12:881–92.

Fuller KA. Scattering and absorption cross sections of compounded spheres. III. Spheres containing arbitrarily located spherical inhomogeneities. J Opt Soc Am A 1995b;12:893–904.

Fuller KA, Kattawar GW. Consummate solution to the problem of classical electromagnetic scattering by an ensemble of spheres. I: Linear chains. Opt Lett 1988a;13:90–2.

Fuller KA, Kattawar GW. Consummate solution to the problem of classical electromagnetic scattering by an ensemble of spheres. II: Clusters of arbitrary configuration. Opt Lett 1988b;13:1063–5.

Fuller KA, Mackowski DW. Electromagnetic scattering by compounded spherical particles. In: Mishchenko MI, Hovenier JW, Travis LD., editors. Light scattering by nonspherical particles: theory, measurements, and applications. San Diego: Academic Press; 2000. p. 225–72.

Fuller KA, Kattawar GW, Wang RT. Electromagnetic scattering from two dielectric spheres: further comparisons between theory and experiment. Appl Opt 1986;25:2521–9.

Fuller KA, Malm WC, Kreidenweis SM. Effects of mixing on extinction by carbonaceous particles. J Geophys Res 1999;104:15941–54.

Geller PE, Tsuei TG, Barber PW. Information content of the scattering matrix for spheroidal particles. Appl Opt 1985;24: 2391–6.

Gérardy JM, Ausloos M. Absorption spectrum of clusters of spheres from the general solution of Maxwell's equations. II. Optical properties of aggregated metal spheres. Phys Rev B 1982;25:4204–29.

Gerding M, Baumgarten G, Blum U. et al. Observation of an unusual mid-stratospheric aerosol layer in the Arctic: possible sources and implications for polar vortex dynamics. Ann Geophys 2003;21:1057–69.

Germer TA. Light scattering by slightly nonspherical particles on surfaces. Opt Lett 2002;27:1159–61.

Glatter O, Hofer M. Interpretation of elastic light scattering data in real space. II. Nonspherical and inhomogeneous monodisperse systems. J Colloid Interface Sci 1988;122:484–95.

Gledhill TM, McCall A. Circular polarization by scattering from spheroidal dust grains. Mon Not R Astron Soc 2000;314: 123–37.

Goedecke GH, O'Brien SG. Scattering by irregular inhomogeneous particles via the digitized Green's function algorithm. Appl Opt 1988;27:2431–8.

González F, Videen G, Valle PJ. et al. Light scattering computational methods for particles on substrates. JQSRT 2001;70: 383–93.

Gordon HR, Du T. Light scattering by nonspherical particles: application to coccoliths detached from *Emiliania huxleyi*. Limnol Oceanogr 2001;46:1438–54.

Gosset M. Effect of nonuniform beam filling on the propagation of radar signals at X-band frequencies Part. II: examination of differential phase shift. J Atmos Oceanic Technol 2004;21:358–67.

Guo J, Tsang L, Asher W. et al. Applications of dense media radiative transfer theory for passive microwave remote sensing of foam covered ocean. IEEE Trans Geosci Remote Sens 2001;39:1019–27.

Gustafson BÅS, Greenberg JM, Kolokolova L. et al. Interactions with electromagnetic radiation: theory and laboratory simulations. In: Grün E, Gustafson BÅS, Dermott S, Fechtig H., editors. Interplanetary dust. Berlin: Springer; 2001. p. 509–67.

Haferman JL. Microwave scattering by precipitation. In: Mishchenko MI, Hovenier JW, Travis LD., editors. Light scattering by nonspherical particles: theory measurements and applications. San Diego: Academic Press; 2000. p. 481–524.

Haferman JL, Smith TF, Krajewski WF. A multi-dimensional discrete-ordinates method for polarized radiative transfer. I. Validation for randomly oriented axisymmetric particles. JQSRT 1997;58:379–98.

Hamid A-K. Modeling the scattering from a dielectric spheroid by a system of dielectric spheres. J Electromagn Waves Appl 1996;10:723–9.

Hamid AK, Hamid M. A plane electromagnetic wave scattering by a conducting sphere partially buried in a ground plane. J Electromagn Waves Appl 2000;14:615–27.

Hamid AK, Hamid M. Electromagnetic scattering by a dielectric sphere partially buried in an infinite plane. Can J Phys 2002;80:979–86.

Hamid A-K, Ciric IR, Hamid M. Multiple scattering by a linear array of conducting spheres. Can J Phys 1990a;68:1157–65.

Hamid A-K, Ciric IR, Hamid M. Electromagnetic scattering by an arbitrary configuration of dielectric spheres. Can J Phys 1990b;68:1419–28.

Hamid A-K, Ciric IR, Hamid M. Iterative solution of the scattering by an arbitrary configuration of conducting or dielectric spheres. IEE Proc H 1991;138:565–72.

Hamid A-K, Ciric IR, Hamid M. Analytic solutions of the scattering by two multilayered dielectric spheres. Can J Phys 1992;70:696–705.

Hamid A-K, Hussein MI, Hamid M. Radar cross section of a system of conducting spheres each coated with a dielectric layer. J Electromagn Waves Appl 2003;17:431–45.

Havemann S, Baran AJ. Extension of T-matrix to scattering of electromagnetic plane waves by nonaxisymmetric dielectric particles: application to hexagonal ice cylinders. JQSRT 2001;70:139–58.

Havemann S, Baran AJ, Edwards JM. Implementation of the T-matrix method on a massively parallel machine: a comparison of hexagonal ice cylinder single-scattering properties using the T-matrix and improved geometric optics methods. JQSRT 2003;79–80:707–20.

Heintzenberg J, Okada K, Luo BP. Distribution of optical properties among atmospheric submicrometer particles of given electrical mobilities. J Geophys Res 2002;107 (doi:10.1029/2001JD000372).

Hill SC, Benner RE. Morphology-dependent resonances. In: Barber PW, Chang RK., editors. Optical effects associated with small particles. Singapore: World Scientific; 1988. p. 3–61.

Hill SC, Hill AC, Barber PW. Light scattering by size/shape distributions of soil particles and spheroids. Appl Opt 1984;23: 1025–31.

Hill SC, Videen G, Pendleton JD. Reciprocity method for obtaining the far fields generated by a source inside or near a microparticle. J Opt Soc Am B 1997;14:2522–9.

Hızal A. Scattering from perfect conductors and layered dielectrics using both incoming and outgoing wave functions. In: Varadan VK, Varadan VV., editors. Acoustic, electromagnetic and elastic wave scattering—focus on the T-matrix approach. New York: Pergamon Press; 1980. p. 169–90.

Ho KC, Allen FS. An approach to the inverse obstacle problem from the scattering Mueller matrix. Inverse Probl 1994;10: 387–400.

Hofer M, Glatter O. Mueller matrix calculations for randomly oriented rotationally symmetric objects with low contrast. Appl Opt 1989;28:2389–400.

Hogan RJ, Illingworth AJ, Sauvageot H. Measuring crystal size in cirrus using 35- and 84-GHz radars. J Atmos Oceanic Technol 2000;17:27–37.

Holler S, Pan Y, Chang RK. et al. Two-dimensional angular optical scattering for the characterization of airborne microparticles. Opt Lett 1998;23:1489–91.

Holler S, Auger J-C, Stout B. et al. Observations and calculations of light scattering from clusters of spheres. Appl Opt 2000;39:6873–87.

Holt AR. The Fredholm integral equation method and comparison with the T-matrix approach. In: Varadan VK, Varadan VV., editors. Acoustic electromagnetic and elastic wave scattering—focus on the T-matrix approach. New York: Pergamon Press; 1980. p. 255–68.

Holt AR. The scattering of electromagnetic waves by single hydrometeors. Radio Sci 1982;17:929–45.

Höpfner M, Blumenstock T, Hase F. et al. Mountain polar stratospheric cloud measurements by ground based FTIR solar absorption spectroscopy. Geophys Res Lett 2001;28:2189–92.

Hovenier JW, Mackowski DW. Symmetry relations for forward and backward scattering by randomly oriented particles. JQSRT 1998;60:483–92.

Hovenier JW, Lumme K, Mishchenko MI. et al. Computations of scattering matrices of four types of non-spherical particles using diverse methods. JQSRT 1996;55:695–705.

Hu R-M, Carslaw KS, Hostetler C. et al. Microphysical properties of wave polar stratospheric clouds retrieved from lidar measurements during SOLVE/THESEO 2000. J Geophys Res 2002;107:8294.

Huang X, Jin Y-Q. Numerical simulations of polarized scattering from random clusters of spatially-oriented, nonspherical scatterers. J Electron 1998;15:267–73.

Hubbert JC, Bringi VN. Studies of the polarimetric covariance matrix. II: modeling and polarization errors. J Atmos Oceanic Technol 2003;20:1011–22.

Iatì MA, Cecchi-Pestellini C, Williams DA. et al. Porous interstellar grains. Mon Not R Astron Soc 2001;322:749–56.

Ioannidou MP, Chrissoulidis DP. Electromagnetic-wave scattering by a sphere with multiple spherical inclusions. J Opt Soc Am A 2002;19:505–12.

Ioannidou MP, Skaropoulos NC, Chrissoulidis DP. Study of interactive scattering by clusters of spheres. J Opt Soc Am A 1995;12:1782–9.

Ioannidou MP, Bakatsoula DI, Chrissoulidis DP. Scattering of radiowaves by melting ice particles: an eccentric spheres model. JQSRT 1999;63:585–97.

Ishikawa H, Tamaru H, Miyano K. Microsphere resonators strongly coupled to a plane dielectric substrate: coupling via the optical near field. J Opt Soc Am A 2000;17:802–13.

Ishimaru A, Lesselier D, Yeh C. Multiple scattering calculations for nonspherical particles based on the vector radiative transfer theory. Radio Sci 1984;19:1356–66.

Iskander MF, Lakhtakia A. Extension of the iterative EBCM to calculate scattering by low-loss or lossless elongated dielectric objects. Appl Opt 1984;23:948–53.

Iskander MF, Barber PW, Durney CH, Massoudi H. Irradiation of prolate spheroidal models of humans in the near field of a short electric dipole. IEEE Trans Microwave Theory Tech 1980;28:801–7.

Iskander MF, Lakhtakia A, Durney CH. A new iterative procedure to solve for scattering and absorption by dielectric objects. Proc IEEE 1982;70:1361–2.

Iskander MF, Lakhtakia A, Durney CH. A new procedure for improving the solution stability and extending the frequency range of EBCM. IEEE Trans Antennas Propag 1983;31:317–24.

Iskander MF, Olson SC, Benner RE, Yoshida D. Optical scattering by metallic and carbon aerosols of high aspect ratio. Appl Opt 1986;25:2514–20.

Iskander MF, Chen HY, Penner JE. Optical scattering and absorption by branched chains of aerosols. Appl Opt 1989a;28: 3083–91.

Iskander MF, Chen HY, Duong TV. A new sectioning procedure for calculating scattering and absorption by elongated dielectric objects. IEEE Trans Electromagn Compat 1989b;31:157–63.

Jain YM, Watson PA. Attenuation in melting snow on microwave- and millimetre-wave terrestrial radio links. Electron Lett 1985;21:68–9.

Jakeman E. Polarization fluctuations in light scattered by small particles. In: Moreno F, González F., editors. Light scattering from microstructures. Berlin: Springer; 2000. p. 179–89.

Jalava J-P, Taavitsainen V-M, Haario H, Lamberg L. Determination of particle and crystal size distribution from turbidity spectrum of TiO_2 pigments by means of T-matrix. JQSRT 1998;60:399–409.

Jin Y-Q, Huang X. Numerical simulations of T-matrix solution for polarized bistatic scattering from a cluster of scatterers. Opt Commun 1996a;124:27–32.

Jin Y-Q, Huang X. Numerical T-matrix solution for polarized scattering from a cluster of spatially oriented, nonspherical scatterers. Microwave Opt Technol Lett 1996b;12:154–8.

Johnson BR. Light scattering from a spherical particle on a conducting plane. 1. Normal incidence. J Opt Soc Am A 1992;9: 1341–51 (Errata: 1993;10:766).

Johnson BR. Morphology-dependent resonances of a dielectric sphere on a conducting plane. J Opt Soc Am A 1994;11: 2055–64.

Johnson BR. Calculation of light scattering from a spherical particle on a surface by the multipole expansion method. J Opt Soc Am A 1996;13:326–37.

Jones PD, Mackowski DW. Non-Kirchhoff surface using media with directionally varying absorption efficiency. J Thermophys Heat Transfer 1995;9:202–9.

Joshi JJ, Shah HS, Mehta RV. Application of multiflux theory based on scattering by nonspherical particles to the problem of modeling optical characteristics of pigmented paint film. II. Color Res Appl 2003;28:308–16.

Kahn BH, Eldering A, Clough SA. et al. Near micron-sized cirrus cloud particles in high- resolution infrared spectra: an orographic case study. Geophys Res Lett 2003;30:1441.

Kahn R, West R, McDonald D. et al. Sensitivity of multiangle remote sensing observations to aerosol sphericity. J Geophys Res 1997;102:16861–70.

Kahnert M. Reproducing the optical properties of fine desert dust aerosols using ensembles of simple model particles. JQSRT 2004;85:231–49.

Kahnert FM, Stamnes JJ, Stamnes K. Application of the extended boundary condition method to homogeneous particles with point-group symmetries. Appl Opt 2001a;40:3110–23.

Kahnert FM, Stamnes JJ, Stamnes K. Application of the extended boundary condition method to particles with sharp edges: a comparison of two surface integration approaches. Appl Opt 2001b;40:3101–9.

Kahnert FM, Stamnes JJ, Stamnes K. Can simple particle shapes be used to model scalar optical properties of an ensemble of wavelength-sized particles with complex shapes? J Opt Soc Am A 2002a;19:521–31.

Kahnert FM, Stamnes JJ, Stamnes K. Using simple particle shapes to model the Stokes scattering matrix of ensembles of wavelength-sized particles with complex shapes: possibilities and limitations. JQSRT 2002b;74:167–82.

Kahnert FM, Stamnes JJ, Stamnes K. Surface-integral formulation for electromagnetic scattering in spheroidal coordinates. JQSRT 2003;77:61–78.

Kalashnikova OV, Kahn R, Sokolik IN, Li W-H. Ability of multiangle remote sensing observations to identify and distinguish mineral dust types: optical models and retrievals of optically thick plumes. J Geophys Res 2005;110:D18S14.

Karlsson A, Kristensson G. Electromagnetic scattering from subterranean obstacles in a stratified ground. Radio Sci 1983;18: 345–56.

Kattawar GW, Dean CE. Electromagnetic scattering from two dielectric spheres: comparison between theory and experiment. Opt Lett 1983;8:48–50.

Keenan TD, Carey LD, Zrnić DS, May PT. Sensitivity of 5-cm wavelength polarimetric radar variables to raindrop axial ratio and drop size distribution. J Appl Meteorol 2001;40:526–45.

Kennedy PC, Rutledge SA, Petersen WA, Bringi VN. Polarimetric radar observations of hail formation. J Appl Meteorol 2001;40:1347–66.

Kerola DX, Larson SM. Analysis of coma dust optical properties in comet C/1995 O1 (Hale-Bopp). II. Effects of polarization. Icarus 2001;149:351–6.

Khlebtsov NG. Light attenuation and scattering by a chaotically oriented ensemble: exact solutions in the T-matrix approach. Opt Spectrosc 1991;71:88–9.

Khlebtsov NG. Orientational averaging of light-scattering observables in the T-matrix approach. Appl Opt 1992;31:5359–65.

Khlebtsov NG. The determination of the average particle size by the relaxation of optical orientational effects. Colloid J 1998;60:388–94.

Khlebtsov NG, Mel'nikov AG. Depolarization of light scattered by fractal smoke clusters: an approximate anisotropic model. Opt Spectrosc 1995;79:605–9.

Khlebtsov NG, Melnikov AG. Structural anisotropy of fractal clusters and orientational optic effects in transmitted light. Colloid J 1998;60:781–9.

Khlebtsov NG, Melnikov AG, Bogatyrev VA. The linear dichroism and birefringence of colloidal dispersions: approximate and exact approaches. J Colloid Interface Sci 1991;146:463–78.

Khlebtsov NG, Melnikov AG, Bogatyrev VA, Sirota AI. The orientational optic effects in colloidal systems: approximate and exact approaches. In: Jennings BR, Stoylov SP., editors. Colloid and molecular electrooptics. Bristol: IOP Publishing; 1992. p. 13–20.

Khlebtsov N, Melnikov A, Shchyogolev S. et al. Anisotropic and spectral properties of biological scattering objects with the ordered particle orientation. Proc SPIE 1994;2082:33–42.

Khlebtsov NG, Bogatyrev VA, Dykman LA, Melnikov AG. Optical properties of colloidal gold and its biospecific conjugates. Colloid J 1995;57:384–95.

Khlebtsov NG, Bogatyrev VA, Dykman LA, Mel'nikov AG. Spectral properties of colloidal gold. Opt Spectrosc 1996a;80: 113–21.

Khlebtsov NG, Bogatyrev VA, Dykman LA, Melnikov AG. Spectral extinction of colloidal gold and its biospecific conjugates. J Colloid Interface Sci 1996b;180:436–45.

Khlebtsov NG, Melnikov AG, Bogatyrev VA, Sirota AI. Electrooptics effects in dilute suspensions of bacterial cells and fractal aggregates. JQSRT 1999a;63:469–78.

Khlebtsov NG, Melnikov AG, Bogatyrev VA. Relaxation optic phenomena in polydisperse suspensions and determination of particle sizes using transmitted light parameters. Colloids Surf A 1999b;148:17–28.

Khlebtsov NG, Dykman LA, Krasnov YaM, Mel'nikov AG. Light absorption by the clusters of colloidal gold and silver particles formed during slow and fast aggregation. Colloid J 2000;62:765–79.

Khlebtsov NG, Bogatyrev VA, Dykman LA. et al. Optical properties of colloidal-gold bioconjugates. Izv Vuzov Appl Nonlin Dynamics 2002a;10 (Special English Issue No. 3):172–87.

Khlebtsov NG, Maksimova IL, Tuchin VV, Wang L. Introduction to light scattering by biological objects. In: Tuchin VV., editor. Handbook of optical biomedical diagnostics. Bellingham, WA: SPIE Press; 2002. p. 31–167.

Khlebtsov NG, Trachuk LA, Mel'nikov AG. A new spectral resonance of metallic nanorods. Opt Spectrosc 2004a;97:97–9.

Khlebtsov NG, Melnikov AG, Dykman LA, Bogatyrev VA. Optical properties and biomedical applications of nanostructures based on gold and silver bioconjugates. In: Videen G, Yatskiv Ya, Mishchenko M., editors. Photopolarimetry in remote sensing. Dordrecht, The Netherlands: Kluwer Academic Publishers; 2004b. p. 265–308.

Kim JH, Ehrman SH, Mulholland GW, Germer TA. Polarized light scattering by dielectric and metallic spheres on silicon wafers. Appl Opt 2002;41:5405–12.

Kim JH, Ehrman SH, Mulholland GW, Germer TA. Polarized light scattering by dielectric and metallic spheres on oxidized silicon surfaces. Appl Opt 2004;43:585–91.

Kimura H. Light-scattering properties of fractal aggregates: numerical calculations by a superposition technique and the discrete-dipole approximation. JQSRT 2001;70:581–94.

Kimura H, Kolokolova L, Mann I. Optical properties of cometary dust. Constraints from numerical studies on light scattering by aggregate particles. Astron Astrophys 2003;407:L5–8.

Kiselev AD, Reshetnyak VYu, Sluckin TJ. Light scattering by optically anisotropic scatterers: T-matrix theory for radial and uniform anisotropies. Phys Rev E 2002;65:056609.

Kleinman RE, Roach GF, Ström SEG. The null field method and modified Green functions. Proc Roy Soc London A 1984;394: 121–36.

Kollias P, Albrecht BA, Marks Jr FD. Raindrop sorting induced by vertical drafts in convective clouds. Geophys Res Lett 2001;28:2787–90.

Kollias P, Albrecht BA, Marks Jr F. Why Mie? Accurate observations of vertical air velocities and raindrops using a cloud radar. Bull Am Meteorol Soc 2002;83:1471–83.

Kollias P, Albrecht BA, Marks Jr FD. Cloud radar observations of vertical drafts and microphysics in convective rain. J Geophys Res 2003;108:4053.

Kolokolova L, Jockers K, Chernova G, Kiselev N. Properties of cometary dust from color and polarization. Icarus 1997;126: 351–61.

Kolokolova L, Hanner MS, Levasseur-Regourd A-C, Gustafson BÅS. Physical properties of cometary dust from light scattering and thermal emission. In: Festou MC, Keller HU, Weaver HA., editors. Comets II. Tucson, AZ: University of Arizona Press; 2004. p. 577–604.

Kouzoubov A, Brennan MJ, Thomas JC. Treatment of polarization in laser remote sensing of ocean water. Appl Opt 1998;37: 3873–85.

Kouzoubov A, Brennan MJ, Thomas JC, Abbot RH. Monte Carlo simulations of the influence of particle nonsphericity on remote sensing of ocean water. J Geophys Res 1999;104:31731–7.

Krieger UK, Braun C, Imbach L. et al. An experimental examination of intensity fluctuations of a host droplet containing an inclusion. JQSRT 2003;79/80:873–80.

Krieger UK, Corti T, Videen G. Using photon-counting histograms to characterize levitated liquid aerosol particles with a single, solid inclusion. JQSRT 2004;89:191–200.

Kristensson G. Electromagnetic scattering from buried inhomogeneities—a general three-dimensional formalism. J Appl Phys 1980;51:3486–500.

Kristensson G. Natural frequencies of circular disks. IEEE Trans Antennas Propag 1984;32:442–8.

Kristensson G, Ström S. The T matrix approach to scattering from buried inhomogeneities. In: Varadan VK, Varadan VV., editors. Acustic electromagnetic and elastic wave scattering—focus on the T-matrix approach. New York: Pergamon Press; 1980. p. 135–67.

Kristensson G, Ström S. Electromagnetic scattering from geophysical targets by means of the T-matrix approach: a review of some recent results. Radio Sci 1982;17:903–12.

Kristensson G, Waterman PC. The T matrix for acoustic and electromagnetic scattering by circular disks. J Acoust Soc Am 1982;72:1612–25.

Kristensson G, Ramm AG, Ström S. Convergence of the T matrix approach in scattering theory. II. J Math Phys 1983;24: 2619–31.

Krotkov NA, Krueger AJ, Bhartia PK. Ultraviolet optical model of volcanic clouds for remote sensing of ash and sulfur dioxide. J Geophys Res 1997;102:21891–904.

Krotkov NA, Flittner DE, Krueger AJ. et al. Effect of particle non-sphericity on satellite monitoring of drifting volcanic ash clouds. JQSRT 1999;63:613–30.

Kuik F, de Haan JF, Hovenier JW. Benchmark results for single scattering by spheroids. JQSRT 1992;47:477–89.

Kuik F, de Haan JF, Hovenier JW. Single scattering of light by circular cylinders. Appl Opt 1994;33:4906–18.

Kummerow CD, Weinman JA. Radiative properties of deformed hydrometeors for commonly used passive microwave frequencies. IEEE Trans Geosci Remote Sens 1988;26:629–38.

Lacis AA, Mishchenko MI. Climate forcing, climate sensitivity, and climate response: a radiative modeling perspective on atmospheric aerosols. In: Charlson R, Heintzenberg J., editors. Aerosol forcing of climate. New York: Wiley; 1995. p. 11–42.

Lai HM, Lam CC, Leung PT, Young K. Effect of perturbations on the widths of narrow morphology-dependent resonances in Mie scattering. J Opt Soc Am B 1991;8:1962–73.

Laitinen H, Lumme K. T-matrix method for general star-shaped particles: first results. JQSRT 1998;60:325–34.

Lakhtakia A. The extended boundary condition method for scattering by a chiral scatterer in a chiral medium: formulation and analysis. Optik 1991;86:155–61.

Lakhtakia A, Iskander MF. Theoretical and experimental evaluation of power absorption in elongated biological objects at and beyond resonance. IEEE Trans Electromagn Compat 1983a;25:448–53.

Lakhtakia A, Iskander MF. Scattering and absorption characteristics of lossy dielectric objects exposed to the near fields of aperture sources. IEEE Trans Antennas Propag 1983b;31:111–20.

Lakhtakia A, Iskander MF, Durney CH, Massoudi H. Near-field absorption in prolate spheroidal models of humans exposed to a small loop antenna of arbitrary orientation. IEEE Trans Microwave Theory Tech 1981;29:588–94.

Lakhtakia A, Iskander MF, Durney CH, Massoudi H. Irradiation of prolate spheroidal models of humans and animals in the near field of a small loop antenna. Radio Sci 1982a;17:77S–84S.

Lakhtakia A, Iskander MF, Durney CH, Massoudi H. Absorption characteristics of prolate spheroidal models exposed to the near fields of electrically small apertures. IEEE Trans Biomed Eng 1982b;29:569–76.

Lakhtakia A, Iskander MF, Durney CH. An iterative extended boundary condition method for solving the absorption characteristics of lossy dielectric objects of large aspect ratios. IEEE Trans Microwave Theory Tech 1983;31:640–7.

Lakhtakia A, Varadan VK, Varadan VV. Scattering by highly aspherical targets: EBCM coupled with reinforced orthogonalization. Appl Opt 1984a;23:3502–4.

Lakhtakia A, Varadan VK, Varadan VV. Scattering by lossy dielectric nonspherical objects with nonvanishing magnetic succeptibility J Appl Phys 1984b;56:3057–60.

Lakhtakia A, Sitaram N, Varadan VK, Varadan VV. Post-resonance scattering by lossy dielectric biological targets: point dipole sources. Innov Tech Biol Med 1984c;5:417–24.

Lakhtakia A, Varadan VK, Varadan VV. Scattering and absorption characteristics of lossy dielectric, chiral, nonspherical objects. Appl Opt 1985;24:4146–54.

Lambert S, Moustier S, Dussouillez Ph. et al. Analysis of the structure of very large bacterial aggregates by small-angle multiple light scattering and confocal image analysis. J Colloid Interface Sci 2003;262:384–90.

Landgraf M, Augustsson K, Grün E, Gustafson BÅS. Deflection of the local interstellar dust flow by solar radiation pressure. Science 1999;286:2319–22.

Lapalme R, Patitsas TAJ. Light scattering by anthophyllite-crocidolite asbestos fibers. I. The domain of convergence of the EBCM theory. Part Part Syst Charact 1993a;10:111–7.

Lapalme R, Patitsas TAJ. Light scattering by anthophyllite-crocidolite asbestos fibers. II. Comparison of various approximate theories with the EBCM theory. Part Part Syst Charact 1993b;10:212–21.

Latimer P, Barber P. Scattering by ellipsoids of revolution: a comparison of theoretical methods. J Colloid Interface Sci 1978;63:310–6.

Lazzari R, Simonsen I, Bedeaux D. et al. Polarizability of truncated spheroidal particles supported by a substrate: model and applications. Eur Phys J B 2001;24:267–84.

Lazzari R, Roux S, Simonsen I. et al. Multipolar plasmon resonances in supported silver particles: the case of Ag/α-Al_2O_3 (0001). Phys Rev B 2002;65:235424.

Lee SC. Light scattering by closely spaced parallel cylinders embedded in a finite dielectric slab. J Opt Soc Am A 1999;16: 1350–61.

Lee SC, Grzesik JA. Light scattering by closely spaced parallel cylinders embedded in a semi-infinite dielectric medium. J Opt Soc Am A 1998;15:163–73.

Lee Y-K, Yang P, Mishchenko MI. et al. Use of circular cylinders as surrogates for hexagonal pristine ice crystals in scattering calculations at infrared wavelengths. Appl Opt 2003;42:2653–64.

Lewin L. On the restricted validity of point-matching techniques. IEEE Trans Microwave Theory Tech 1970;18:1041–7.

Li L-W, Leong M-S, Huang Y. Electromagnetic radiation of antennas in the presence of an arbitrarily shaped dielectric object: Green dyadics and their applications. IEEE Trans Antennas Propag 2001;49:84–90.

Liang S, Mishchenko MI. Calculations of the soil hot spot effect using the coherent backscattering theory. Remote Sens Environ 1997;60:163–73.

Liou KN, Cai Q, Barber PW, Hill SC. Scattering phase matrix comparison for randomly hexagonal cylinders and spheroids. Appl Opt 1983;22:1684–7.

Litvinov PV, Tishkovets VP, Muinonen K, Videen G. Coherent opposition effect for discrete random media. In: van Tiggelen B, Skipetrov SE., editors. Wave scattering in complex media. Dordrecht, The Netherlands: Kluwer Academic Publishers; 2003. p. 567–81.

Liu L, Mishchenko MI. Constraints on PSC particle microphysics derived from lidar observations. JQSRT 2001;70:817–31.

Liu Y, Arnott WP, Hallett J. Anomalous diffraction theory for arbitrarily oriented finite circular cylinders and comparison with exact T-matrix results. Appl Opt 1998;37:5019–30.

Liu Y, Arnott WP, Hallett J. Particle size distribution retrieval from multispectral optical depth: influences of particle nonsphericity and refractive index. J Geophys Res 1999;104:31753–62.

Liu C, Weigel T, Schweiger G. Structural resonances in a dielectric sphere on a dielectric surface illuminated by an evanescent wave. Opt Commun 2000a;185:249–61.

Liu S, Li LW, Leong MS, Yeo TS. Scattering by an arbitrarily shaped rotationally uniaxial anisotropic object: electromagnetic fields and dyadic Green's functions. Progr Electromagn Res 2000b;29:87–106.

Liu Zh, Sugimoto N, Murayama T. Extinction-to-backscatter ratio of Asian dust observed with high-spectral-resolution lidar and Raman lidar. Appl Opt 2002;41:2760–7.

Lopatin VN, Paramonov LYe. Investigation of the scattering cross sections and scattering matrices of horizontally and randomly oriented "soft" particles. Izvestiya Atmos Oceanic Phys 1989;25:449–53.

Lopatin VN, Sid'ko FYa. Introduction to optics of cell suspensions. Novosibirsk: Nauka; 1988 (in Russian).

Lopatin VN, Sid'ko FYa, Paramonov LYe. Estimation of the light scattering and absorbing properties of suspensions of "soft" spheroidal particles in the Rayleigh approximation and the anomalous diffraction approximation. Izv Atmos Oceanic Phys 1987;23:555–61.

Lu C-C, Chew WC. A recursive aggregation method for the computation of electromagnetic scattering by randomly distributed particles. Microwave Opt Technol Lett 1993;6:774–7.

Lu C-C, Chew WC. The use of Huygens' equivalence principle for solving 3-D volume integral equation of scattering. IEEE Trans Antennas Propag 1995;43:500–7.

Lu CC, Chew WC, Tsang L. The application of recursive aggregate T-matrix algorithm in the Monte Carlo simulations of the extinction rate of random distribution of particles. Radio Sci 1995;30:25–8.

Lucas PW. Computation of light scattering in young stellar objects. JQSRT 2003;79/80:921–37.

Lumme K. Scattering properties of interplanetary dust particles. In: Mishchenko MI, Hovenier JW, Travis LD., editors. Light scattering by nonspherical particles: theory, measurements, and applications. San Diego: Academic Press; 2000. p. 555–83.

Lumme K, Rahola J. Comparison of light scattering by stochastically rough spheres, best-fit spheroids and spheres. JQSRT 1998;60:439–50.

Luo BP, Voigt C, Fueglistaler S, Peter T. Extreme NAT supersaturations in mountain wave ice PSCs: a clue to NAT formation. J Geophys Res 2003;108:4441.

Ma Y, Varadan VV, Varadan VK. Scattered intensity of a wave propagating in a discrete random medium. Appl Opt 1988;27: 2469–77.

Macke A, Mishchenko MI, Muinonen K, Carlson BE. Scattering of light by large nonspherical particles: ray tracing approximation versus T-matrix method. Opt Lett 1995;20:1934–6.

Mackowski DW. Analysis of radiative scattering for multiple sphere configurations. Proc Roy Soc London A 1991;433: 599–614.

Mackowski DW. Calculation of total cross sections of multiple-sphere clusters. J Opt Soc Am A 1994;11:2851–61.

Mackowski DW. An effective medium method for calculation of the T matrix of aggregated spheres. JQSRT 2001;70:441–64.

Mackowski DW. Discrete dipole moment method for calculation of the T matrix for nonspherical particles. J Opt Soc Am A 2002;19:881–93.

Mackowski DW, Jones PD. Theoretical investigation of particles having directionally dependent absorption cross section. J Thermophys Heat Transfer 1995;9:193–201.

Mackowski DW, Mishchenko MI. Calculation of the T matrix and the scattering matrix for ensembles of spheres. J Opt Soc Am A 1996;13:2266–78.

Mannoni A, Flesia C, Bruscaglioni P, Ismaelli A. Multiple scattering from Chebyshev particles: Monte Carlo simulations for backscattering in lidar geometry. Appl Opt 1996;35:7151–64.

Manoharan VN, Elsesser MT, Pine DJ. Dense packing and symmetry in small clusters of microspheres. Science 2003;301: 483–7.

Martin PA. On connections between boundary integral equations and T-matrix methods. Eng Anal Bound Elem 2003;27: 771–7.

Massoudi H, Durney CH, Barber PW, Iskander MF. Postresonance electromagnetic absorption by man and animals. Bioelectromagnetics 1982;3:333–9.

Mazumder MdM, Hill SC, Barber PW. Morphology-dependent resonances in inhomogeneous spheres: comparison of the layered T-matrix method and the time-independent perturbation method. J Opt Soc Am A 1992;9:1844–53.

Merchant BL, Moser PJ, Nagl A, Überall H. Complex pole patterns of the scattering amplitude for conducting spheroids and finite-length cylinders. IEEE Trans Antennas Propag 1988;36:1769–78.

Miao J, Johnsen K-P, Buehler S, Kokhanovsky A. The potential of polarization measurements from space at mm and sub-mm wavelengths for determining cirrus cloud parameters. Atmos Chem Phys 2003;3:39–48.

Millar RF. Rayleigh hypothesis in scattering problems. Electron Lett 1969;5:416–7.

Min M, Hovenier JW, de Koter A. Scattering and absorption cross sections for randomly oriented spheroids of arbitrary size. JQSRT 2003;79/80:939–51.

Mishchenko MI. Interstellar light absorption by randomly oriented nonspherical particles. Sov Astron Lett 1989;15:299–302.

Mishchenko MI. Accuracy of Rayleigh approximation in calculation of interstellar extinction curves. Kinem Phys Celest Bodies 1990a;6 (3):99–100.

Mishchenko MI. Calculation of integral scattering characteristics of randomly oriented nonspherical particles. Kinem Fiz Nebes Tel 1990b;6 (5):95–6.

Mishchenko MI. Absorption and polarization of radiation by partially oriented dust grains in the interstellar medium. Sov Astron Lett 1990c;16:407–10.

Mishchenko MI. Extinction of light by randomly-oriented non-spherical grains. Astrophys Space Sci 1990d;164:1–13.

Mishchenko MI. Light scattering by randomly oriented axially symmetric particles. J Opt Soc Am A 1991a;8:871–82 (Errata: 1992;9:497).

Mishchenko MI. Extinction and polarization of transmitted light by partially aligned nonspherical grains. Astrophys J 1991b;367:561–74.

Mishchenko MI. Scattering cross section for randomly oriented particles of arbitrary shape. Kinem Phys Celest Bodies 1991c;7 (5):83–6.

Mishchenko MI. Reflection of polarized light by plane-parallel slabs containing randomly-oriented, nonspherical particles. JQSRT 1991d;46:171–81.

Mishchenko MI. Radiation pressure on randomly-oriented nonspherical particles. Astrophys Space Sci 1991e;180:163–9.

Mishchenko MI. Infrared absorption by shape distributions of NH_3 ice particles: an application to the Jovian atmosphere. Earth Moon Planets 1991f;53:149–56.

Mishchenko MI. Coherent propagation of polarized millimeter waves through falling hydrometeors. J Electromagn Waves Appl 1992a;6:1341–51.

Mishchenko MI. Enhanced backscattering of polarized light from discrete random media: calculations in exactly the backscattering direction. J Opt Soc Am A 1992b;9:978–82.

Mishchenko MI. Light scattering by nonspherical ice grains: an application to noctilucent cloud particles. Earth Moon Planets 1992c;57:203–11.

Mishchenko MI. Light scattering by size–shape distributions of randomly oriented axially symmetric particles of a size comparable to a wavelength. Appl Opt 1993;32:4652–66.

Mishchenko MI. Asymmetry parameters of the phase function for densely packed scattering grains. JQSRT 1994;52:95–110.

Mishchenko MI. Coherent backscattering by two-sphere clusters. Opt Lett 1996;21:623–5.

Mishchenko MI. Calculation of the amplitude matrix for a nonspherical particle in a fixed orientation. Appl Opt 2000;39: 1026–31.

Mishchenko MI, Hovenier JW. Depolarization of light backscattered by randomly oriented nonspherical particles. Opt Lett 1995;20:1356–8.

Mishchenko MI, Lacis AA. Morphology-dependent resonances of nearly spherical particles in random orientation. Appl Opt 2003;42:5551–6.

Mishchenko MI, Macke A. Incorporation of physical optics effects and computations of the Legendre expansion for ray-tracing phase functions involving δ-function transmission. J Geophys Res 1998;103:1799–805.

Mishchenko MI, Macke A. How big should hexagonal ice crystals be to produce halos? Appl Opt 1999;38:1626–9.

Mishchenko MI, Mackowski DW. Light scattering by randomly oriented bispheres. Opt Lett 1994;19:1604–6.

Mishchenko MI, Mackowski DW. Electromagnetic scattering by randomly oriented bispheres: comparison of theory and experiment and benchmark calculations. JQSRT 1996;55:683–94.

Mishchenko MI, Sassen K. Depolarization of lidar returns by small ice crystals: an application to contrails. Geophys Res Lett 1998;25:309–12.

Mishchenko MI, Travis LD. T-matrix computations of light scattering by large spheroidal particles. Opt Commun 1994a;109: 16–21.

Mishchenko MI, Travis LD. Light scattering by polydisperse rotationally symmetric nonspherical particles: linear polarization. JQSRT 1994b;51:759–78.

Mishchenko MI, Travis LD. Light scattering by polydispersions of randomly oriented spheroids with sizes comparable to wavelengths of observation. Appl Opt 1994c;33:7206–25.

Mishchenko MI, Travis LD. Capabilities and limitations of a current FORTRAN implementation of the T-matrix method for randomly oriented, rotationally symmetric scatterers. JQSRT 1998;60:309–24.

Mishchenko MI, Videen G. Single-expansion EBCM computations for osculating spheres. JQSRT 1999;63:231–6.

Mishchenko MI, Mackowski DW, Travis LD. Scattering of light by bispheres with touching and separated components. Appl Opt 1995a;34:4589–99.

Mishchenko MI, Lacis AA, Carlson BE, Travis LD. Nonsphericity of dust-like tropospheric aerosols: implications for aerosol remote sensing and climate modeling. Geophys Res Lett 1995b;22:1077–80.

Mishchenko MI, Travis LD, Macke A. Scattering of light by polydisperse, randomly oriented, finite circular cylinders. Appl Opt 1996a;35:4927–40.

Mishchenko MI, Travis LD, Mackowski DW. T-matrix computations of light scattering by nonspherical particles: a review. JQSRT 1996b;55:535–75.

Mishchenko MI, Travis LD, Kahn RA, West RA. Modeling phase functions for dustlike tropospheric aerosols using a shape mixture of randomly oriented polydisperse spheroids. J Geophys Res 1997a;102:16831–47.

Mishchenko MI, Wielaard DJ, Carlson BE. T-matrix computations of zenith-enhanced lidar backscatter from horizontally oriented ice plates. Geophys Res Lett 1997b;24:771–4.

Mishchenko MI, Hovenier JW, Wiscombe WJ, Travis LD. Overview of scattering by nonspherical particles. In: Mishchenko MI, Hovenier JW, Travis LD., editors. Light scattering by nonspherical particles: theory, measurements, and applications. San Diego: Academic Press; 2000a. p. 29–60.

Mishchenko MI, Travis LD, Macke A. T-matrix method and its applications. In: Mishchenko MI, Hovenier JW, Travis LD., editors. Light scattering by nonspherical particles: theory, measurements, and applications. San Diego: Academic Press; 2000b. p. 147–72.

Mishchenko MI, Travis LD, Lacis AA. Scattering, absorption, and emission of light by small particles. Cambridge: Cambridge University Press; 2002.

Mishchenko MI, Hovenier JW, Mackowski DW. Singe scattering by a small volume element. J Opt Soc Am A 2004;21:71–87.

Mitchell DL, Arnott WP, Schmitt C. et al. Photon tunneling contributions to extinction for laboratory grown hexagonal columns. JQSRT 2001;70:761–76.

Miyazaki H, Jimba Y. *Ab initio* tight-binding description of morphology-dependent resonance in a bisphere. Phys Rev B 2000;62:7976–97.

Miyazaki HT, Miyazaki H, Miyano K. Anomalous scattering from dielectric bispheres in the specular direction. Opt Lett 2002;27:1208–10.

Miyazaki HT, Miyazaki H, Miyano K. Analysis of specular resonance in dielectric bispheres using rigorous and geometrical-optics theories. J Opt Soc Am A 2003;20:1771–84.

Miyazaki HT, Miyazaki H, Jimba Y. et al. Light diffraction from a bilayer lattice of microspheres enhanced by specular resonance. J Appl Phys 2004;95:793–805.

Modinos A. Scattering of electromagnetic waves by a plane of spheres—formalism. Physica A 1987;141:575–88.

Morel A, Antoine D, Gentili B. Bidirectional reflectance of oceanic waters: accounting for Raman emission and varying particle scattering phase function. Appl Opt 2002;41:6289–306.

Morgan MA, Chen CH, Hill SC, Barber PW. Finite element–boundary integral formulation for electromagnetic scattering. Wave Motion 1984;6:91–103.

Morita N. Another method of extending the boundary condition for the problem of scattering by dielectric cylinders. IEEE Trans Antennas Propag 1979;27:97–9.

Mourant JR, Johnson TM, Carpenter S. et al. Polarized angular dependent spectroscopy of epithelial cells and epithelial cell nuclei to determine the size scale of scattering structures. J Biomed Opt 2002;7:378–87.

Mroczka J, Wysoczański D, Onofri F. Optical parameters and scattering properties of red blood cells. Opt Appl 2002;32: 691–700.

Mugnai A, Wiscombe WJ. Scattering of radiation by moderately nonspherical particles. J Atmos Sci 1980;37:1291–307.

Mugnai A, Wiscombe WJ. Scattering from nonspherical Chebyshev particles. 1. Cross sections, single-scattering albedo, asymmetry factor, and backscattered fraction. Appl Opt 1986;25:1235–44.

Mugnai A, Wiscombe WJ. Scattering from nonspherical Chebyshev particles. 3. Variability in angular scattering patterns. Appl Opt 1989;28:3061–73.

Müller D, Mattis I, Wandinger U. et al. Saharan dust over a central European EARLINET-AERONET site: combined observations with Raman lidar and Sun photometer. J Geophys Res 2003;108:4345.

Muttiah RS. Application of the T-matrix method to light scattering from a leaf. In: Muttiah RS., editor. From laboratory spectroscopy to remotely sensed spectra of terrestrial ecosystems. Dordrecht, The Netherlands: Kluwer Academic Publishers; 2002. p. 109–20.

Neo CP, Varadan VK, Varadan VV. Comparison of long-wavelength T-matrix multiple-scattering theory and size-dependent Maxwell–Garnett formula. Microwave Opt Technol Lett 1999;23:1–4.

Ngo D, Pinnick RG. Suppression of scattering resonances in inhomogeneous microdroplets. J Opt Soc Am A 1994;11:1352–9.

Ngo D, Videen G. Light scattering from spheres. Opt Eng 1997;36:150–6.

Ngo D, Videen G, Chýlek P. A FORTRAN code for the scattering of EM waves by a sphere with a nonconcentric spherical inclusion. Comput Phys Commun 1996;99:94–112.

Ngo D, Videen G, Dalling R. Chaotic light scattering from a system of osculating, conducting spheres. Phys Lett A 1997;227: 197–202.

Nieminen TA, Rubinsztein-Dunlop H, Heckenberg NR. Calculation and optical measurement of laser trapping forces on non-spherical particles. JQSRT 2001a;70:627–37.

Nieminen TA, Rubinsztein-Dunlop H, Heckenberg NR, Bishop AI. Numerical modelling of optical trapping. Comput Phys Commun 2001b;142:468–71.

Nieminen TA, Rubinsztein-Dunlop H, Heckenberg NR. Calculation of the T-matrix: general considerations and application of the point-matching method. JQSRT 2003a;79/80:1019–29.

Nieminen TA, Rubinsztein-Dunlop H, Heckenberg NR. Multipole expansion of strongly focused laser beams. JQSRT 2003b;79/80:1005–17.

Nilsson AMK, Alsholm P, Karlsson A, Andersson-Engels S. T-matrix computations of light scattering by red blood cells. Appl Opt 1998;37:2735–48.

Nousiainen T, Vermeulen K. Comparison of measured single-scattering matrix of feldspar particles with T-matrix simulations using spheroids. JQSRT 2003;79/80:1031–42.

Oppel UG, Cheng AYS, Ding J. et al. A representation of a multiple scattering lidar return from layers of clouds by a multi-dimensional distribution characterizing the contributions of the diffusion of the emitted beam. Proc SPIE 2002;4539: 169–79.

Ovod VI. Modeling of multiple scattering from an ensemble of spheres in a laser beam. Part Part Syst Charact 1999;16:106–12.

Ovod VI, Mackowski DW, Finsy R. Modeling of the effect of multiple scattering in photon correlation spectroscopy: plane-wave approach. Langmuir 1998;14:2610–8.

Paramonov LE. A simple formula for estimation of the absorption cross section of biological suspensions. Opt. Spectrosc 1994a;77:506–12.

Paramonov LE. On optical equivalence of randomly oriented ellipsoidal and polydisperse spherical particles. The extinction, scattering and absorption cross sections. Opt Spectrosc 1994b;77:589–92.

Paramonov LE. Mueller matrix for an ensemble of particles of arbitrary shape with an arbitrary square integrable orientation distribution function. Opt Spectrosc 1994c;77:819–27.

Paramonov LE. Few-parameter models for evaluation of cross section of extinction, scattering, and absorption of atmospheric aerosol. Atmos Oceanic Opt 1994d;7:613–8.

Paramonov LE. Extinction and scattering cross sections of randomly oriented particles of arbitrary shape. Atmos Oceanic Opt 1994e;7:646–7.

Paramonov LE. T-matrix approach and the angular momentum theory in light scattering problems by ensembles of arbitrarily shaped particles. J Opt Soc Am A 1995a;12:2698–707.

Paramonov LE. Light attenuation and scattering cross sections for an ensemble of particles of arbitrary shape with an arbitrary orientational distribution function. Opt Spectrosc 1995b;79:109–15.

Paramonov LE, Lopatin VN. Angular dependence of the matrix of light scattering by a suspension of soft spheroidal particles. Opt Spectrosc 1989;66:94–6.

Paramonov LE, Lopatin VN. Covergence of the T-matrix method. Opt Spectrosc 1990;69:375–7.

Paramonov LE, Lopatin VN, Sidko FYa. Dependence of the absorptivity of soft spheroidal particles on their shape and orientation. Opt Spectrosc 1986a;60:220–2.

Paramonov LE, Lopatin VN, Sidko FYa. Light scattering by soft spheroidal particles. Opt Spectrosc 1986b;61:358–61.

Paramonov LE, Lopatin VN, Sidko FY. Effect of the asphericity of oriented soft particles of a polydisperse suspension on the elements of its light scattering matrix. Opt Spectrosc 1989;66:231–3.

Pellegrino P, Videen G, Pinnick RG. Quantitative light scattering angular correlation of conglomerate particles. Appl Opt 1997;36:7672–7.

Peltoniemi JI. Variational volume integral equation method for electromagnetic scattering by irregular grains. JQSRT 1996;55: 637–47.

Peter Th, Luo BP, Wirth M. et al. Ultrathin tropical tropopause clouds (UTTCs): I. Cloud morphology and occurrence. Atmos Chem Phys 2003;3:1083–91.

Peterson B. Multiple scattering of waves by an arbitrary lattice. Phys Rev A 1977;16:1363–70.

Peterson B, Ström S. T matrix for electromagnetic scattering from an arbitrary number of scatterers and representations of $E(3)^*$. Phys Rev D 1973;8:3661–78.

Peterson B, Ström S. T-matrix formulation of electromagnetic scattering from multilayered scatterers. Phys Rev D 1974;10: 2670–84.

Petrova EV. Optical thickness and shape of dust particles of the Martian aerosol. Solar Syst Res 1999a;33:260–6.

Petrova EV. Mars aerosol optical thickness retrieved from measurements of the polarization inversion angle and the shape of dust particles. JQSRT 1999b;63:667–76.

Petrova EV, Markiewicz WJ. Light scattering by nonspherical particles: a modification of the statistical model and application to the Martian aerosol. Solar Syst Res 1997;31:369–76.

Petrova EV, Jockers K, Kiselev NN. Light scattering by aggregates with sizes comparable to the wavelength: an application to cometary dust. Icarus 2000;148:526–36.

Petrova EV, Jockers K, Kiselev NN. A negative branch of polarization for comets and atmosphereless celestial bodies and the light scattering by aggregate particles. Solar Syst Res 2001a;35:390–9.

Petrova EV, Jockers K, Kiselev NN. Light scattering by aggregate particles comparable in size to wavelength: application to cometary dust. Solar Syst Res 2001b;35:57–69.

Pilinis C, Li X. Particle shape and internal inhomogeneity effects on the optical properties of tropospheric aerosols of relevance to climate forcing. J Geophys Res 1998;103:3789–800.

Pinnick RG, Pendleton JD, Videen G. Response characteristics of the particle measuring systems active scattering aerosol spectrometer probes. Aerosol Sci Technol 2000;33:334–52.

Pitter MC, Hopcraft KI, Jakeman E, Walker JG. Structure of polarization fluctuations and their relation to particle shape. JQSRT 1999;63:433–44.

Porco CC, West RA, McEwen A. et al. Cassini imaging of Jupiter's atmosphere, satellites, and rings. Science 2003;229:1541–7.

Porstendorfer J, Berg K-J, Berg G. Calculation of extinction and scattering spectra of large spheroidal gold particles embedded in a glass matrix. JQSRT 1999;63:479–86.

Prabhu DR, Davies M, Videen G. Light scattering calculations from oleic-acid droplets with water inclusions. Opt Express 2001;8:308–13.

Prigent C, Pardo JR, Mishchenko MI, Rossow WB. Microwave polarized signatures generated within cloud systems: Special Sensor Microwave Imager (SSM/I) observations interpreted with radiative transfer simulations. J Geophys Res 2001;106:28243–58.

Prodi F, Sturniolo O, Battaglia A, Medini R. Radar parameters simulation for populations of spherical and non-spherical hydrometeors: dependence on size distributions, shapes and composition. JQSRT 1999;63:677–99.

Pulbere S, Wriedt T. Light scattering by cylindrical fibers with high aspect ratio using the null-field method with discrete sources. Part Part Syst Charact 2004;21:213–8.

Pustovit VN, Sotelo JA, Niklasson GA. Coupled multipolar interactions in small-particle metallic clusters. J Opt Soc Am A 2002;19:513–8.

Qingan W, Zixiang O, Liping L, Zengming C. A comparative study on the backscattering ability of raindrops and ice particles (hail). Contr Atmos Phys 1998;71:377–86.

Quinten M. Optical effects associated with aggregates of clusters. J Cluster Sci 1999;10:319–58.

Quinten M, Kreibig U. Optical extinction spectra of systems of small metal particles with aggregates. In: Gouesbet G, Gréhan G., editors. Optical particle sizing. Theory and practice. New York: Plenum Press; 1988. p. 249–58.

Quinten M, Kreibig U. Absorption and elastic scattering of light by particle aggregates. Appl Opt 1993;32:6173–82.

Quinten M, Pack A, Wannemacher R. Scattering and extinction of evanescent waves by small particles. Appl Phys B 1999;68: 87–92.

Quinten M, Friehmelt R, Ebert K-F. Sizing of aggregates of spheres by a white-light optical particle counter with 90° scattering angle. J Aerosol Sci 2000;32:63–72.

Quinten M, Kreibig U, Henning T, Mutschke H. Wavelength-dependent optical extinction of carbonaceous particles in atmospheric aerosols and interstellar dust. Appl Opt 2002;41:7102–13.

Quirantes A. Light scattering properties of spheroidal coated particles in random orientation. JQSRT 1999;63:263–75.

Quirantes A, Delgado AV. Particle size determinations in colloidal suspensions of randomly oriented ellipsoids. Progr Colloid Polymer Sci 1995a;98:145–50.

Quirantes A, Delgado AV. Size-shape determination of nonspherical particles in suspension by means of full and depolarized static light scattering. Appl Opt 1995b;34:6256–62.

Quirantes A, Delgado A. Experimental size determination of spheroidal particles via the T-matrix method. JQSRT 1998;60: 463–74.

Quirantes A, Delgado AV. Scattering cross sections of randomly oriented coated spheroids. JQSRT 2001;70:261–72.

Quirantes A, Delgado Á. Cross section calculations of randomly oriented bispheres in the small particle regime. JQSRT 2003;78:179–86.

Quirantes A, Arroyo F, Quirantes-Ros J. Multiple light scattering by spherical particle systems and its dependence on concentration: a T-matrix study. J Colloid Interface Sci 2001;240:78–82.

Ramm AG. Convergence of the T-matrix approach to scattering theory. J Math Phys 1982;23:1123–5.

Ramm AG. Numerically efficient version of the T-matrix method. Applicable Anal. 2002;80:385–93.

Rannou P, Cabane M, Botet R, Chassefière E. A new interpretation of scattered light measurements at Titan's limb. J Geophys Res 1997;102:10997–1013.

Rao TC, Barakat R. Plane-wave scattering by a conducting cylinder partially buried in a ground plane. 1. TM case. J Opt Soc Am A 1989;6:1270–80.

Rao TC, Barakat R. Plane-wave scattering by a conducting cylinder partially buried in a ground plane 2. TE case. J Opt Soc Am A 1991;8:1986–90.

Rao TC, Barakat R. Near field scattering by a conducting cylinder partially buried in a conducting plane. Opt Commun 1994;111:18–25.

Ravey J-C, Mazeron P. Light scattering by large spheroids in the physical optics approximation: numerical comparison with other approximate and exact results. J Opt (Paris) 1983;14:29–41.

Reichardt J, Tsias A, Behrendt A. Optical properties of PSC Ia-enhanced at UV and visible wavelengths: model and observations. Geophys Res Lett 2000;27:201–4.

Reichardt J, Reichardt S, Yang P, McGee TJ. Retrieval of polar stratospheric cloud microphysical properties from lidar measurements: dependence on particle shape assumptions. J Geophys Res 2002;107:8282.

Reid JS, Jonsson HH, Maring HB. et al. Comparison of size and morphological measurements of coarse mode dust particles from Africa. J Geophys Res 2003;108:8593.

Roberti L, Kummerow C. Monte Carlo calculations of polarized microwave radiation emerging from cloud structures. J Geophys Res 1999;104:2093–104.

Roessler DM, Wang D-SY, Kerker M. Optical absorption by randomly oriented carbon spheroids. Appl Opt 1983;22:3648–51.

Rother T. Generalization of the separation of variables method for non-spherical scattering of dielectric objects. JQSRT 1998;60:335–53.

Rother T, Kahnert M, Doicu A, Wauer J. Surface Green' function of the Helmholtz equation in spherical coordinates. Progr Electromagn Res 2002;38:47–95.

Roumeliotis JA, Fikioris JG. Scattering of plane waves from an eccentrically coated metallic sphere. J Franklin Inst 1981;312: 41–59.

Rozenberg VI. Scattering and attenuation of electromagnetic radiation by atmospheric particles. NASA Technical Translation F-771, Washington, DC: NASA; 1974. (Original Russian edition: Leningrad: Gidrometeoizdat, 1972.)

Ruppin R. Electromagnetic scattering from finite dielectric cylinders. J Phys D: Appl Phys 1990;23:757–63.

Ruppin R. Optical absorption of a coated sphere above a substrate. Physica A 1991;178:195–205.

Ruppin R. Polariton modes of spheroidal microcrystals. J Phys: Condens Matter 1998;10:7869–78.

Ruppin R. Effects of high-order multipoles on the extinction spectra of dispersive bispheres. Opt Commun 1999;168:35–8.

Ryde NP, Matijević E. Color effects of uniform colloidal particles of different morphologies packed into films. Appl Opt 1994;33:7275–81.

Şahin A, Miller EL. Recursive T-matrix methods for scattering from multiple dielectric and metallic objects. IEEE Trans Antennas Propag 1998;46:672–8.

Saija R, Toscano G, Sindoni OI. et al. Effect of the "chemical reactions" on the absorption coefficient of a polydisperse model aerosol. Nuovo Cim 1985;85:79–93.

Saija R, Iatì MA, Borghese F. et al. Beyond Mie theory: the transition matrix approach in interstellar dust modeling. Astrophys J 2001a;559:993–1004.

Saija R, Iatì MA, Denti P. et al. Backscattered intensity from model atmospheric ice crystals in the millimeter-wave range. Appl Opt 2001b;40:5337–42.

Saija R, Iatì MA, Giusto A. et al. Radiation pressure cross-sections of fluffy interstellar grains. Mon Not R Astron Soc 2003a;341:1239–45.

Saija R, Iatì MA, Denti P. et al. Efficient light-scattering calculations for aggregates of large spheres. Appl Opt 2003b;42: 2785–93.

Sakai T, Shibata T, Iwasaka Y. et al. Case study of Raman lidar measurements of Asian dust events in 2000 and 2001 at Nagoya and Tsukuba, Japan. Atmos Environ 2002;36:5479–89.

Sakai T, Shibata T, Hara K. et al. Raman lidar and aircraft measurements of tropospheric aerosol particles during the Asian dust event over central Japan: case study on 23 April 1996. J Geophys Res 2003;108:4349.

Schmidt K, Rother T, Wauer J. The equivalence of applying the Extended Boundary Condition and the continuity conditions for solving electromagnetic scattering problems. Opt Commun 1998;150:1–4.

Schnaiter M, Horvath H, Möhler O. et al. UV-VIS-NIR spectral optical properties of soot and soot-containing aerosols. J Aerosol Sci 2003;34:1421–44.

Schneider JB, Peden IC. Differential cross section of a dielectric ellipsoid by the T-matrix extended boundary condition method. IEEE Trans Antennas Propag 1988;36:1317–21.

Schneider J, Brew J, Peden IC. Electromagnetic detection of buried dielectric targets. IEEE Trans Geosci Remote Sens 1991;29:555–62.

Schuh R, Wriedt T. Computer programs for light scattering by particles with inclusions. JQSRT 2001;70:715–23.

Schuh R, Wriedt T. Light scattering by bent cylindrical fibers for fiber length and diameter characterization. Part Part Syst Charact 2003;20:243–9.

Schulz FM, Stamnes K, Stamnes JJ. Scattering of electromagnetic waves by spheroidal particles: a novel approach exploiting the T matrix computed in spheroidal coordinates. Appl Opt 1998a;37:7875–96.

Schulz FM, Stamnes K, Stamnes JJ. Modeling the radiative transfer properties of media containing particles of moderately and highly elongated shape. Geophys Res Lett 1998b;25:4481–4.

Schulz FM, Stamnes K, Stamnes JJ. Point-group symmetries in electromagnetic scattering. J Opt Soc Am A 1999a;16:853–65.

Schulz FM, Stamnes K, Stamnes JJ. Shape dependence of the optical properties in size-shape distributions of randomly oriented prolate spheroids, including highly elongated shapes. J Geophys Res 1999b;104:9413–21.

Secker DR, Greenaway R, Kaye PH. et al. Light scattering from deformed droplets and droplets with inclusions. I. Experimental results. Appl Opt 2000;39:5023–30.

Seliga TA, Bringi VN. Differential reflectivity and differential phase shift: applications in radar meteorology. Radio Sci 1978;13:271–5.

Seow Y-L, Li L-W, Leong M-S. et al. An efficient TCS formula for rainfall microwave attenuation: T-matrix approach and 3-D fitting for oblate spheroidal raindrops. IEEE Trans Antennas Propag 1998;46:1176–81.

Sharma R, Balakrishnan N. Scattering of electromagnetic waves from arbitrary shaped bodies coated with a chiral material. Smart Mater Struct 1998;7:851–66.

Shvalov AN, Soini JT, Surovtsev IV. et al. Individual Escherichia coli cells studied from light scattering with the scanning flow cytometer. Cytometry 2000;41:41–5.

Sid'ko FYa, Lopatin VN, Paramonov LYe. Polarization characteristics of suspensions of biological particles. Novosibirsk: Nauka; 1990 (in Russian).

Simão AG, Guimarães LG, Videen G. A comparative study in resonant light scattering between spherical and cylindrical dielectric hosts with a metallic inclusion. JQSRT 2001;70:777–86.

Simonsen I, Lazzari R, Jupille J, Roux S. Numerical modeling of the optical response of supported metallic particles. Phys Rev B 2000;61:7722–33.

Sindoni OI, Borghese F, Denti P. et al. Multiple electromagnetic scattering from a cluster of spheres. II. Symmetrization. Aerosol Sci Technol 1984;3:237–43.

Sinyuk A, Torres O, Dubovik O. Combined use of satellite and surface observations to infer the imaginary part of refractive index of Saharan dust. Geophys Res Lett 2003;30:1081.

Siqueira PR, Sarabandi K. *T*-matrix determination of effective permittivity for three-dimensional dense random media. IEEE Trans Antennas Propag 2000;48:317–27.

Skaropoulos NC. Backward and forward scattering of electromagnetic waves from partially aligned axially symmetric particles. JQSRT 2003;79/80:1061–81.

Skaropoulos NC, Russchenberg HWJ. Light scattering by arbitrarily oriented rotationally symmetric particles. J Opt Soc Am A 2002;19:1583–91.

Skaropoulos NC, Ioannidou MP, Chrissoulidis DP. Indirect mode-matching solution to scattering from a dielectric sphere with an eccentric inclusion. J Opt Soc Am A 1994;11:1859–66.

Skaropoulos NC, Ioannidou MP, Chrissoulidis DP. Induced EM field in a layered eccentric spheres model of the head: plane-wave and localized source exposure. IEEE Trans Microwave Theory Tech 1996;44:1963–73.

Sreerekha TR, Buehler S, Emde C. A simple new radiative transfer model for simulating the effect of cirrus clouds in the microwave spectral region. JQSRT 2002;75:611–24.

Stefanou N, Modinos A. Scattering of electromagnetic waves by a disordered two-dimensional array of spheres. J Phys: Condens Matter 1993;5:8859–68.

Stein S. Addition theorems for spherical wave functions. Quart Appl Math 1961;19:15–24.

Stout B, Auger J-C, Lafait J. Individual and aggregate scattering matrices and cross-sections: conservation laws and reciprocity. J Mod Opt 2001;48:2105–28.

Stout B, Auger J-C, Lafait J. A transfer matrix approach to local field calculations in multiple-scattering problems. J Mod Opt 2002a;49:2129–52.

Stout B, Andraud C, Prot D. et al. Complete field descriptions in three-dimensional multiple scattering problems: a transfer-matrix approach. J Opt A: Pure Appl Opt 2002b;4:S182–7.

Stout B, Andraud C, Stout S, Lafait J. Absorption in multiple-scattering systems of coated spheres. J Opt Soc Am A 2003;20: 1050–9.

Streekstra GJ, Hoekstra AG, Heethaar RM. Anomalous diffraction by arbitrarily oriented ellipsoids: applications in ektacytometry. Appl Opt 1994;33:7288–96.

Ström S. *T* matrix for electromagnetic scattering from an arbitrary number of scatterers with continuously varying electromagnetic properties. Phys Rev D 1974;10:2685–90.

Ström S. On the integral equations for electromagnetic scattering. Am J Phys 1975;43:1060–9.

Ström S. Introduction to integral representations and integral equations for time-harmonic acoustic, electromagnetic and elastodynamic wave fields. In: Varadan VV, Lakhtakia A, Varadan VK., editors. Field representations and introduction to scattering. Amsterdam: North-Holland; 1991a. p. 37–141.

Ström S. The scattered field. In: Varadan VV, Lakhtakia A, Varadan VK., editors. Field representations and introduction to scattering. Amsterdam: North-Holland; 1991b. p. 143–64.

Ström S, Zheng W. Basic features of the null field method for dielectric scatterers. Radio Sci 1987;22:1273–81.

Ström S, Zheng W. The null field approach to electromagnetic scattering from composite objects. IEEE Trans Antennas Propag 1988;36:376–82.

Ström S, Zheng W. Null-field computations of radar cross sections of composite objects. Proc IEEE 1989;77:761–9.

Stubenrauch CJ, Holz R, Chédin A. et al. Retrieval of cirrus ice crystal sizes from 8.3 and 11.1 μm emissivities determined by the improved initialization inversion of TIROS-N Operational Vertical Sounder observations. J Geophys Res 1999;104: 31793–808.

Sturniolo O, Mugnai A, Prodi F. A numerical sensitivity study on the backscattering at 35.8 GHz from precipitation-sized hydrometeors. Radio Sci 1995;30:903–19.

Thomas A, Borrmann S, Kiemle C. et al. In situ measurements of background aerosol and subvisible cirrus in the tropical tropopause region. J Geophys Res 2002;107 (doi:10.1029/2001JD001385).

Throop HB, Esposito LW. G ring particle sizes derived from ring plane crossing observations. Icarus 1998;131:152–66.

Tishkovets VP. Light scattering by clusters of spherical particles. Cooperative effects under chaotic orientation. Kinem Phys Celest Bodies 1994;10 (2):50–4.

Tishkovets VP. Backscattering of light by close-packed systems of particles. Opt Spectrosc 1998;85:212–7.

Tishkovets VP. Multiple scattering of light by a layer of discrete random medium: backscattering. JQSRT 2002;72:123–37.

Tishkovets VP, Litvinov PV. Coefficients of light extinction by randomly oriented clusters of spherical particles in the double scattering approximation. Opt Spectrosc 1996;81:288–91.

Tishkovets VP, Litvinov PV. Opposition effects in light scattering by regolith-type media. Solar Syst Res 1999;33:162–7.

Tishkovets VP, Mishchenko MI. Coherent backscattering of light by a layer of discrete random medium. JQSRT 2004;86: 161–80.

Tishkovets VP, Shkuratov YuG, Litvinov PV. Comparison of collective effects at scattering by randomly oriented clusters of spherical particles. JQSRT 1999;61:767–73.

Tishkovets VP, Litvinov PV, Lyubchenko MV. Coherent opposition effects for semi-infinite discrete random medium in the double-scattering approximation. JQSRT 2002;72:803–11.

Tishkovets V, Litvinov P, Petrova E. et al. Backscattering effects for discrete random media. In: Videen G, Yatskiv Ya, Mishchenko M. et al., editors. Photopolarimetry in remote sensing. Dordrecht, The Netherlands: Kluwer Academic Publishers; 2004a. p. 221–42.

Tishkovets VP, Petrova EV, Jockers K. Optical properties of aggregate particles comparable in size to the wavelength. JQSRT 2004b;86:241–65.

Toon OB, Browell EV, Kinne S. et al. An analysis of lidar observations of polar stratospheric clouds. Geophys Res Lett 1990;17:393–6.

Toon OB, Tabazadeh A, Browell EV, Jordan J. Analysis of lidar observations of Arctic polar stratospheric clouds during January 1989. J Geophys Res 2000;105:20589–615.

Troitsky AV, Osharin AM, Korolev AV. et al. Studying the polarization characteristics of thermal microwave emission from a cloudy atmosphere. Radiophys Quant Electron 2001;44:935–48.

Troitsky AV, Osharin AM, Korolev AV, Strapp JW. Polarization of thermal microwave atmospheric radiation due to scattering by ice particles in clouds. J Atmos Sci 2003;60:1608–20.

Tsang L. Scattering of electromagnetic waves from a half space of nonspherical particles. Radio Sci 1984;19:1450–60.

Tsang L, Kong JA. Multiple scattering of electromagnetic waves by random distributions of discrete scatterers with coherent potential and quantum mechanical formalism. J Appl Phys 1980;51:3465–85.

Tsang L, Kong JA. Effective propagation constants for coherent electromagnetic wave propagation in media embedded with dielectric scatters. J Appl Phys 1982;53:7162–73.

Tsang L, Kong JA. Scattering of electromagnetic waves from a half space of densely distributed dielectric scatterers. Radio Sci 1983;18:1260–72.

Tsang L, Kong JA. Scattering of electromagnetic waves: advanced topics. New York: Wiley; 2001.

Tsang L, Kong JA, Shin RT. Radiative transfer theory for active remote sensing of a layer of nonspherical particles. Radio Sci 1984;19:629–42.

Tsang L, Kong JA, Shin RT. Theory of microwave remote sensing. New York: Wiley; 1985.

Tsang L, Mandt CE, Ding KH. Monte Carlo simulations of the extinction rate of dense media with randomly distributed dielectric spheres based on solution of Maxwell's equations. Opt Lett 1992;17:314–6.

Tsang L, Kong JA, Ding K-H. Scattering of electromagnetic waves: theories and applications. New York: Wiley; 2000.

Tsang L, Kong JA, Ding K-H, Ao CO. Scattering of electromagnetic waves: numerical simulations. New York: Wiley; 2001.

Tsias A, Wirth M, Carslaw KS. et al. Aircraft observations of an enhanced type Ia polar stratospheric clouds during APE-POLECAT. J Geophys Res 1999;104:23961–9.

Tzeng YC, Fung AK. T-matrix approach to multiple scattering of EM waves from N-spheres. J Electromagn Waves Appl 1994;8:61–84.

Tzeng H-M, Long MB, Chang RK, Barber PW. Laser-induced shape distortions of flowing droplets deduced from morphology-dependent resonances in fluorescence spectra. Opt Lett 1985;10:209–11.

Überall H, Moser PJ, Merchant BL. et al. Complex acoustic and electromagnetic resonance frequencies of prolate spheroids and related elongated objects and their physical interpretation. J Appl Phys 1985;58:2109–24.

Usami A. Rigorous solutions of light scattering of neighboring TiO_2 particles in nanocrystalline films. Solar Energy Mater Solar Cells 1999;59:163–6.

Varadan VK. Multiple scattering of acoustic, electromagnetic and elastic waves. In: Varadan VK, Varadan VV., editors. Acoustic, electromagnetic and elastic wave scattering—focus on the T-matrix approach. New York: Pergamon Press; 1980. p. 103–34.

Varadan VV, Varadan VK. Multiple scattering of electromagnetic waves by randomly distributed and oriented dielectric scatterers. Phys Rev D 1980a;21:388–94.

Varadan VK, Varadan VV, editors. Acoustic, electromagnetic and elastic wave scattering—focus on the *T*-matrix approach. New York: Pergamon Press; 1980b.

Varadan VK, Bringi VN, Varadan VV. Coherent electromagnetic wave propagation through randomly distributed dielectric scatterers. Phys Rev D 1979;19:2480–9.

Varadan VK, Bringi VN, Varadan VV, Ishimaru A. Multiple scattering theory for waves in discrete random media and comparison with experiments. Radio Sci 1983;18:321–7.

Varadan VK, Ma Y, Varadan VV. Coherent electromagnetic wave propagation through randomly distributed and oriented pair-correlated dielectric scatterers. Radio Sci 1984;19:1445–9.

Varadan VV, Ma Y, Varadan VK. Propagator model including multipole fields for discrete random media. J Opt Soc Am A 1985a;2:2195–201.

Varadan VV, Ma Y, Varadan VK. Anisotropic dielectric properties of media containing aligned non-spherical scatterers. IEEE Trans Antennas Propag 1985b;33:886–90.

Varadan VV, Varadan VK, Ma Y, Steele WA. Effects of nonspherical statistics on EM wave propagation in discrete random media. Radio Sci 1987;22:491–8.

Varadan VV, Lakhtakia A, Varadan VK. Comments on recent criticism of the *T*-matrix method. J Acoust Soc Am 1988;84: 2280–4.

Vargas WE. Optical properties of pigmented coatings taking into account particle interactions. JQSRT 2003;78:187–95.

Vargas WE, Niklasson GA. Reflectance of pigmented polymer coatings: comparisons between measurements and radiative transfer calculations. Appl Opt 2001;40:85–94.

Vargas WE, Niklasson GA. Light-scattering from particles. In: Encyclopedia of surface and colloid science. New York: Marcel Dekker; 2002. p. 3044–56.

Vargas W, Cruz L, Fonseca LF, Gómez M. *T*-matrix approach for calculating local fields around clusters of rotated spheroids. Appl Opt 1993;32:2164–70.

Veihelmann B, Volten H, van der Zande WJ. Light reflected by an atmosphere containing irregular mineral dust aerosol. Geophys Res Lett 2004;31:L04113.

Videen G. Light scattering from a sphere on or near a surface. J Opt Soc Am A 1991;8:483–9 (Errata: 1992;9:844–5).

Videen G. Light scattering from a sphere behind a surface. J Opt Soc Am A 1993;10:110–7.

Videen G. Light scattering from a particle on or near a perfectly conducting surface. Opt Commun 1995;115:1–7.

Videen G. Light scattering from an irregular particle behind a plane interface. Opt Commun 1996;128:81–90.

Videen G. Polarized light scattering from surface contaminants. Opt Commun 1997;143:173–8.

Videen G. Light scattering from a sphere near a plane interface. In: Moreno F, González F., editors. Light scattering from microstructures. Berlin: Springer; 2000. p. 81–96.

Videen G, Bickel WS. An experimental determination of the natural base of logarithms. J Irreproduc Results 1991;36 (2):20–2.

Videen G, Chýlek P. Scattering by a composite sphere with an absorbing inclusion and effective medium approximations. Opt Commun 1998;158:1–6.

Videen G, Ngo D. Light scattering from a cylinder near a plane interface: theory and comparison with experimental data. J Opt Soc Am A 1997;14:70–8.

Videen G, Ngo D. Light scattering multipole solution for a cell. J Biomed Opt 1998;3:212–20.

Videen G, Wolfe WL, Bickel WS. The light-scattering Mueller matrix for a surface contaminated by a single particle in the Rayleigh limit. Opt Eng 1992;31:341–9.

Videen G, Turner MG, Iafelice VJ. et al. Scattering from a small sphere near a surface. J Opt Soc Am A 1993;10:118–26.

Videen G, Ngo D, Chýlek P. Effective-medium predictions of absorption by graphitic carbon in water droplets. Opt Lett 1994;19:1675–7.

Videen G, Ngo D, Chýlek P, Pinnick RG. Light scattering from a sphere with an irregular inclusion. J Opt Soc Am A 1995;12: 922–8.

Videen G, Ngo D, Hart MB. Light scattering from a pair of conducting osculating spheres. Opt Commun 1996;125:275–87.

Videen G, Pellegrino P, Ngo D. et al. Light scattering intensity fluctuations in microdroplets containing inclusions. Appl Opt 1997a;36:6115–7.

Videen G, Pellegrino P, Ngo D. et al. Qualitative light scattering angular correlation of conglomerate particles. Appl Opt 1997b;36:3532–7.

Videen G, Pinnick RG, Ngo D. et al. Asymmetry parameter and aggregate particles. Appl Opt 1998;37:1104–9.

Videen G, Sun W, Fu Q. et al. Light scattering from deformed droplets and droplets with inclusions: II. Theoretical treatment. Appl Opt 2000;39:5031–9.

Videen G, Prabhu DR, Davies M. Light scattering fluctuations of a soft spherical particle containing an inclusion. Appl Opt 2001;40:4054–7.

Videen G, Aslan MM, Mengüç MP. Characterization of metallic nano-particles via surface wave scattering: A. Theoretical framework and formulation. JQSRT 2005;93:195–206.

Vivekanandan J, Adams WM, Bringi VN. Rigorous approach to polarimetric radar modeling of hydrometeor orientation distributions. J Appl Meteorol 1991;30:1053–63.

Voigt C, Larsen N, Deshler T. et al. In situ mountain-wave polar stratospheric cloud measurements: implications for nitric acid trihydrate formation. J Geophys Res 2003;108:8331.

Volten H, Jalava J-P, Lumme K. et al. Laboratory measurements and T-matrix calculations of the scattering matrix of rutile particles in water. Appl Opt 1999;38:5232–40.

Voshchinnikov NV, Il'in VB, Henning Th. et al. Extinction and polarization of radiation by absorbing spheroids: shape/size effects and benchmark results. JQSRT 2000;65:877–93.

Wall DJN. Methods of overcoming numerical instabilities associated with the T-matrix method. In: Varadan VK, Varadan VV., editors. Acoustic, electromagnetic and elastic wave scattering—focus on the T-matrix approach. New York: Pergamon Press; 1980. p. 269–86.

Wang D-S, Barber PW. Scattering by inhomogeneous nonspherical objects. Appl Opt 1979;18:1190–7.

Wang YM, Chew WC. A recursive T-matrix approach for the solution of electromagnetic scattering by many spheres. IEEE Trans Antennas Propag 1993;41:1633–9.

Wang D-S, Chen HCH, Barber PW, Wyatt PJ. Light scattering by polydisperse suspensions of inhomogeneous nonspherical particles. Appl Opt 1979;18:2672–8.

Wang D-S, Kerker M, Chew HW. Raman and fluorescent scattering by molecules embedded in dielectric spheroids. Appl Opt 1980;19:2315–28.

Wang ZL, Hu L, Lin WG. A modified T-matrix formulation for multiple scattering of electromagnetic waves. J Phys D: Appl Phys 1994;27:447–51.

Wang J, Liu X, Christopher SA. et al. The effects of non-sphericity on geostationary satellite retrievals of dust aerosols. Geophys Res Lett 2003;30:2293.

Wannemacher R, Pack A, Quinten M. Resonant absorption and scattering in evanescent fields. Appl Phys B 1999;68:225–32.

Warner C. Effects of shape and orientation of spheroidal raindrops on microwave scattering. Electron Lett 1975;11:328–30.

Warner C, Hizal A. Scattering and depolarization of microwaves by spheroidal raindrops. Radio Sci 1976;11:921–30.

Waterman PC. Matrix formulation of electromagnetic scattering. Proc IEEE 1965;53:805–12.

Waterman PC. Scattering by dielectric obstacles. Alta Frequenza (Speciale) 1969;38:348–52.

Waterman PC. Symmetry, unitarity, and geometry in electromagnetic scattering. Phys Rev D 1971;3:825–39.

Waterman PC. Numerical solution of electromagnetic scattering problems. In: Mittra R., editor. Computer techniques for electromagnetics. Oxford: Pergamon Press; 1973. p. 97–157.

Waterman PC. Matrix methods in potential theory and electromagnetic scattering. J Appl Phys 1979;50:4550–66.

Waterman PC. Survey of T-matrix methods and surface field representations. In: Varadan VK, Varadan VV., editors. Acoustic, electromagnetic and elastic wave scattering—focus on the T-matrix approach. New York: Pergamon Press; 1980. p. 61–78.

Waterman PC. Analytical consequences of the extended boundary condition. Wave Motion 1983;5:273–95.

Waterman PC. Surface fields and the T matrix. J Opt Soc Am A 1999;16:2968–77.

Waterman PC, Pedersen NE. Electromagnetic scattering by periodic arrays of particles. J Appl Phys 1986;59:2609–18.

Wauben WM, de Haan JF, Hovenier JW. Influence of particle shape on the polarized radiation in planetary atmospheres. JQSRT 1993;50:237–46.

West R, Gibbs D, Tsang L, Fung AK. Comparison of optical scattering experiments and the quasi-crystalline approximation for dense media. J Opt Soc Am A 1994;11:1854–8.

Whitney BA, Wolff MJ. Scattering and absorption by aligned grains in circumstellar environments. Astrophys J 2002;574: 205–31.

Wiedner M, Prigent C, Pardo JR. et al. Modeling of passive microwave responses in convective situations using output from mesoscale models: comparison with TRMM/TMI satellite observations. J Geophys Res 2004;109:D06214.

Wielaard DJ, Mishchenko MI, Macke A, Carlson BE. Improved T-matrix computations for large nonabsorbing and weakly absorbing nonspherical particles and comparison with geometrical-optics approximation. Appl Opt 1997;36:4305–13.

Wind MM, Vlieger J, Bedeaux D. The polarizability of a truncated sphere on a substrate I. Physica A 1987a;141:33–57.
Wind MM, Bobbert PA, Vlieger J, Bedeaux D. The polarizability of a truncated sphere on a substrate II. Physica A 1987b;143: 164–82.
Wind MM, Bobbert PA, Vlieger J, Bedeaux D. The polarizability of truncated spheres and oblate spheroids on a substrate: comparison with experimental results. Thin Solid Films 1988;164:57–62.
Wirth M, Tsias A, Dörnbrack A. et al. Model-guided Lagrangian observation and simulation of mountain polar stratospheric clouds. J Geophys Res 1999;104:23971–81.
Wiscombe WJ, Mugnai A. Single scattering from nonspherical Chebyshev particles: a compendium of calculations. NASA Ref. Publ. NASA RP-1157, 1986.
Wiscombe WJ, Mugnai A. Scattering from nonspherical Chebyshev particles. 2. Means of angular scattering patterns. Appl Opt 1988;27:2405–21.
Wittmann RC. Spherical wave operators and the translation formulas. IEEE Trans Antennas Propag 1988;36:1078–87.
Wolff MJ, Clancy RT. Constraints on the size of Martian aerosols from Thermal Emission Spectrometer observations. J Geophys Res 2003;108:5097.
Wong MH, Bjoraker GL, Smith MD. et al. Identification of the 10-μm ammonia ice feature on Jupiter. Planet Space Sci 2004;52:385–95.
Wriedt T. Using the T-matrix method for light scattering computations by non-axisymmetric particles: superellipsoids and realistically shaped particles. Part Part Syst Charact 2002;19:256–68.
Wriedt T, Comberg U. Comparison of computational scattering methods. JQSRT 1998;60:411–23.
Wriedt T, Doicu A. Comparison between various formulations of the extended boundary condition method. Opt Commun 1997;142:91–8.
Wriedt T, Doicu A. Light scattering from a particle on or near a surface. Opt Commun 1998a;152:376–84.
Wriedt T, Doicu A. Formulations of the extended boundary condition method for three-dimensional scattering using the method of discrete sources. J Mod Opt 1998b;45:199–213.
Wriedt T, Doicu A. Scattering analysis of conducting axisymmetic particles using the extended boundary condition method with discrete sources. J Mod Opt 1998c;45:2207–15.
Wriedt T, Doicu A. T-matrix method for light scattering from a particle on or near an infinite surface. In: Moreno F, González F., editors. Light scattering from microstructures. Berlin: Springer; 2000. p. 113–32.
Wurm G, Schnaiter M. Coagulation as unifying element for interstellar polarization. Astrophys J 2002;567:370–5.
Xing Zh-f, Greenberg JM. Efficient method for the calculation of mean extinction. II. Analyticity of the complex extinction efficiency of homogeneous spheroids and finite cylinders. Appl Opt 1994a;33:5783–95.
Xing Zh-f, Greenberg JM. Efficient method for the calculation of mean extinction. III. Approximation or representation of particle-size distributions by rational functions. J Opt Soc Am A 1994b;11:657–70.
Xu Y-l. Electromagnetic scattering by an aggregate of spheres. Appl Opt 1995;34:4573–88.
Xu Y-l. Calculation of the addition coefficients in electromagnetic multisphere-scattering theory. J Comput Phys 1996a;127: 285–98 (Erratum: 1997;134:200).
Xu Y-l. Fast evaluation of the Gaunt coefficients. Math Comput 1996b;65:1601–12.
Xu Y-l. Electromagnetic scattering by an aggregate of spheres: far field. Appl Opt 1997a;36:9496–508.
Xu Y-l. Fast evaluation of Gaunt coefficients: recursive approach. J Comput Appl Math 1997b;85:53–65.
Xu Y-l. Electromagnetic scattering by an aggregate of spheres: asymmetry parameter. Phys Lett A 1998a;249:30–6.
Xu Y-l. Efficient evaluation of vector translation coefficients in multiparticle light-scattering theories. J Comput Phys 1998b;139:137–65.
Xu Y-l. Scattering Mueller matrix of an ensemble of variously shaped small particles. J Opt Soc Am A 2003a;20:2093–105.
Xu Y-l. Radiative scattering properties of an ensemble of variously shaped small particles. Phys Rev E 2003b;67:046620.
Xu H-X. A new method by extending Mie theory to calculate local field in outside/inside of aggregates of arbitrary spheres. Phys Lett A 2003c;312:411–9.
Xu H. Calculation of the near field of aggregates of arbitrary spheres. J Opt Soc Am A 2004;21:804–9.
Xu Y-l, Gustafson BÅS. Experimental and theoretical results of light scattering by aggregates of spheres. Appl Opt 1997;36: 8026–30.
Xu Y-l, Gustafson BÅS. Comparison between multisphere light-scattering calculations: rigorous solution and discrete-dipole approximation. Astrophys J 1999;513:894–909 (Erratum: 1999;522:1206).
Xu Y-l, Gustafson BÅS. A generalized multiparticle Mie-solution: further experimental verification. JQSRT 2001;70:395–419.

Xu Y-l, Khlebtsov NG. Orientation-averaged radiative properties of an arbitrary configuration of scatterers. JQSRT 2003;79/80:1121–37.

Xu Y-l, Wang RT. Electromagnetic scattering by an aggregate of spheres: theoretical and experimental study of the amplitude scattering matrix. Phys Rev E 1998;58:3931–48.

Xu Y-l, Gustafson BÅS, Giovane F. et al. Calculation of the heat-source function in photophoresis of aggregated spheres. Phys Rev E 1999;60:2347–65.

Yang P, Mlynczak MG, Wei H. et al. Spectral signature of ice clouds in the far-infrared region: single-scattering calculations and radiative sensitivity study. J Geophys Res 2003;108:4569.

Yeh C, Woo R, Armstrong JW, Ishimaru A. Scattering by Pruppacher-Pitter raindrops at 30 GHz. Radio Sci 1982a;17:757–65.

Yeh C, Colak S, Barber P. Scattering of sharply focused beams by arbitrarily shaped dielectric particles: an exact solution. Appl Opt 1982b;21:4426–33.

Yilmaz S, Mamedov AM, Sahan H, Gunel G. Mie scattering in ferroelectrics with diffuse phase transitions. Ferroelectrics 2003;291:177–86.

Zakharova NT, Mishchenko MI. Scattering properties of needlelike and platelike ice spheroids with moderate size parameters. Appl Opt 2000;39:5052–7.

Zakharova NT, Mishchenko MI. Scattering by randomly oriented thin ice disks with moderate equivalent-sphere size parameters. JQSRT 2001;70:465–71.

Zhao J-Q, Hu Y-Q. Bridging technique for calculating the extinction efficiency of arbitrary shaped particles. Appl Opt 2003;42:4937–45.

Zhao L, Kelly KL, Schatz GC. The extinction spectra of silver nanoparticle arrays: influence of array structure on plasmon resonance wavelength and width. J Phys Chem B 2003;107:7343–50.

Zheng W. The null field approach to electromagnetic scattering from composite objects: the case with three or more constituents. IEEE Trans Antennas Propag 1988;36:1396–400.

Zheng W. Computation of complex resonance frequencies of isolated composite objects. IEEE Trans Microwave Theory Tech 1989;37:953–61.

Zheng W, Ström S. The null field approach to electromagnetic scattering from composite objects: the case of concavo-convex constituents. IEEE Trans Antennas Propag 1989;37:373–83.

Zheng W, Ström S. The null-field approach to electromagnetic resonance of composite objects. Comput Phys Commun 1991;68:157–74.

Zhong Z, Patskovskyy S, Bouvrette P. et al. The surface chemistry of Au colloids and their interactions with functional amino acids. J Phys Chem B 2004;108:4046–52.

Zrnić DS, Keenan TD, Carey LD, May P. Sensitivity analysis of polarimetric variables at a 5-cm wavelength in rain. J Appl Meteorol 2000;39:1514–26.

Zvyagin AV, Goto K. Mie scattering of evanescent waves by a dielectric sphere. J Opt Soc Am A 1998;15:3003–8.

Zurk LM, Tsang L, Ding KH, Winebrenner DP. Monte Carlo simulations of the extinction rate of densely packed spheres with clustered and nonclustered geometries. J Opt Soc Am A 1995;12:1772–81.

Zurk LM, Tsang L, Winebrenner DP. Scattering properties of dense media from Monte Carlo simulations with application to active remote sensing of snow. Radio Sci 1996;31:803–19.