

Photopolarimetry in Remote Sensing

edited by

Gorden Videen

Army Research Laboratory,
Adelphi, Maryland, U.S.A.

Yaroslav Yatskiv

Main Astronomical Observatory of the National Academy of Sciences of Ukraine,
Kiev, Ukraine

and

Michael Mishchenko

NASA Goddard Institute for Space Studies,
New York, U.S.A.



Kluwer Academic Publishers

Dordrecht / Boston / London

Published in cooperation with NATO Scientific Affairs Division

TABLE OF CONTENTS

Table of Contents	v
Preface	ix
Organizational Structure	xiii

General Information

*Maxwell's Equations, Electromagnetic Waves,
and Stokes Parameters*

M.I. Mishchenko and L.D. Travis1

Polarized Light Scattering by Large Nonspherical Particles

A. Macke and K. Muinonen45

*Optimization of Numerical Inversion in Photopolarimetric
Remote Sensing*

O. Dubovik65

Radiative Transfer

*Eigenvalue Shifting – A New Analytical-Computational
Method in Radiative Transfer Theory*

H. Domke.....107

*Quadratic Integrals in Inverse Problems with
Multiple Scattering*

T. Viik and N.J. McCormick125

Dynamic Systems

Polarization Fluctuation Spectroscopy

K.I. Hopcraft, P.C.Y. Chang, E. Jakeman,
and J.G. Walker137

*Intensity and Polarization Fluctuation Statistics of Light
Scattered by Systems of Particles*

F. González, F. Moreno, J.M. Saiz and J.L de La Peña.....175

Backscatter Polarization

Scattering Properties of Planetary Regoliths Near Opposition

Y. Shkuratov, G. Videen, M. Kreslavsky,
I. Belskaya, V. Kaydash, A. Ovcharenko,
V. Omelchenko, N. Opanasenko, E. Zubko191

Backscattering from Particles Near Planar Surfaces

G. Videen and K. Muinonen209

Backscattering Effects for Discrete Random Media

V. Tishkovets, P. Litvinov, E. Petrova, K. Jockers,
and M. Mishchenko221

Biological Systems

Inverse Polarimetry and Light Scattering from Leaves

S.N. Savenkov and R.S. Muttiah243

Optical Properties and Biomedical Applications of Nanostructures Based on Gold and Silver Bioconjugates

N.G. Khlebtsov, A.G. Melnikov, L.A. Dykman,
and V.A. Bogatyrev265

Astrophysical Phenomena

Polarization of Light by Pre-Main-Sequence Stars in the Visual Wavelengths

V.P. Grinin309

Infrared Polarimetry of Interstellar Dust

J.H. Hough and D.K. Aitken325

Measurements of General Magnetic Fields on Stars with Vigorous Convective Zones Using High-Accuracy Spectropolarimetry

S.I. Plachinda351

<i>Polarimetry and Physics of Solar System Bodies</i>	
A. Morozhenko and A. Vid'machenko	369

<i>Disk-Integrated Polarimetry of Mercury in 2000–2002</i>	
D. Lupishko and N. Kiselev	385

Comets

<i>Polarimetry of Dust in the Solar System: Remote Observations, In-Situ Measurements and Experimental Simulations</i>	
A. Chantal Levasseur-Regourd.....	393

<i>Polarimetry of Comets: Progress and Problems</i>	
N. Kiselev and V. Rosenbush	411

<i>Characterization of Dust Particles Using Photopolarimetric Data: Example of Cometary Dust</i>	
L. Kolokolova, H. Kimura, I. Mann	431

Photopolarimetry Instrumentation

<i>Invitation to Spectropolarimetry</i>	
Y. Yefimov	455

<i>Astronomical Polarimeters and Features of Polarimetric Observations</i>	
A. Morozhenko and A. Vid'machenko	479

Participants	487
Index	495