

Optical Physicist Publishes on Optical Coherence and Polarization

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Emil Wolf, Wilson Professor of Optical Physics and Professor of Optics at the University of Rochester, and co-author of one of the most cited science books of the 20th century, Principles of Optics, has released a new book detailing light's coherence and polarization.

Wolf's new Introduction to the Theory of Coherence and Polarization of Light (Cambridge University Press, 236 pp.) is the first book to provide a unified treatment of these two aspects of statistical optics, both made possible by very recent discoveries, and largely due to Wolf's own research.

Both coherence and polarization are manifestations of uncontrollable fluctuations of electric and magnetic fields inherent in all light sources. In ordinary light, such as produced by an electric bulb or a star, the variations are very rapid and irregular. In lasers, however, the variation is almost completely suppressed, making it possible to use lasers for a variety of precision-demanding applications, such as global telecommunications or common DVD players.

Twenty years ago, Wolf discovered that partial coherence can affect the spectrum of light as it travels through the universe, a finding that surprised physicists and may implications for our knowledge about the size and age of the universe.

With his discoveries Wolf is credited with opening up a new field of medical imaging, known as diffraction tomography, which is being used



to develop clinical imaging devices. Physicians regularly use Wolf's theories to develop new laser-based technologies to see inside the human body and to improve the resolution of ultrasound scans of internal organs.

Wolf is the recipient of numerous awards for his scientific contributions and is an honorary member of the Optical Society of America (OSA), of which he was president in 1978. He is also an honorary member of the Optical Societies of India and Australia and is the recipient of seven honorary degrees from universities in the Netherlands, Great Britain, the Czech Republic, Canada, Denmark, and France.

Wolf co–authored Principles of Optics with Nobel Laureate Max Born, now in its seventh edition. He also co-authored the book Optical Coherence and Quantum Optics with the late Leonard Mandel, DuBridge Professor Emeritus of Physics and Optics at the University of Rochester. Wolf is the editor of Progress in Optics, an ongoing series of volumes of review articles on optics and related subjects. Fifty volumes have been published in this series to date, all under his editorship.

Source: University of Rochester

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