



IEEE LEOS and IEAust ITEE College Lecture

Title : 'Dark Energy', Axial Fields, and Stress Tensors: Polarization Vortices in Optics and Photonics

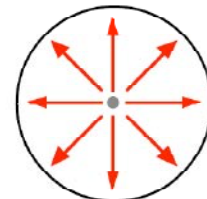
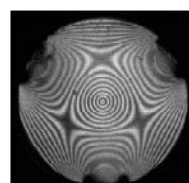
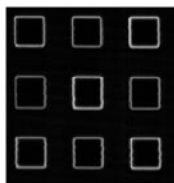
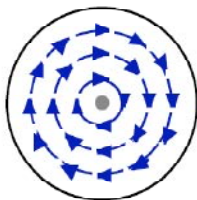
Presenter: Professor Thomas G. Brown
The Institute of Optics
University of Rochester, New York USA



Time : 6:00pm refreshments for 6:30pm lecture
Friday, 14th March 2008

Location : Auditorium, Engineers Australia Building, 21 Bedford St, North Melbourne
There is no admittance fee for this talk and all are welcome.

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Abstract :

Two hundred years after Malus' discovery, the study of polarization and polarization-driven optical phenomena is as active as ever. Increasingly accurate control of polarization combined with expanded thinking about the role of polarization in laser beam propagation, focusing, and coherence, has spawned an interest in new phenomena which may lie hidden in our established understanding of the fundamentals of polarization. One such phenomenon is a polarization vortex, in which the fields appear to swirl about a singular point in the beam. In this talk, I will present some history and recent work on polarization vortices, how they can be created from ordinary laser beams, and their relevance in optical science and technology.

Speaker Biography:

Thomas G. Brown has been on the faculty of the Institute of Optics since July of 1987 and currently serves as chair of undergraduate studies. While at Rochester, he has conducted research in semiconductor optoelectronics, optical fiber microstructures, optical polarization, and optical metrology. His early research focused on frequency-stable semiconductor laser design and silicon-based waveguide technology, including the first experimental observation of all-optical switching in a nonlinear Bragg reflector. This report [APL, 60, 1427 (1992)] is nearing the 100 citation mark. His publications have twice (1993 and 2000) been cited among the best optics-related research by Optics and Photonics News. Professor Brown's recent research activities have included: 1) Focusing and coherence properties of polarization vortex beams; 2) Optical vortices induced by stress birefringent elements; 3) High Q resonators in SOI waveguides, 4) Modeling and characterization of photonic crystal fibers; 5) Optical properties of quantum amplified isomers for

photopolymers. The work on polarization vortices has been applied to semiconductor lithography and inspection, and single molecule imaging [PRL 86, 5251 (2001)].

Professor Brown began his work in optics and optoelectronics in 1978 as an optical fiber systems designer at GTE Laboratories. While there, he wrote the systems modeling software which was used to design the first live-traffic 1.3 μm optical fiber telephone link. Since that time, he has had consultancies and technical collaboration with companies such as IBM, Corning Inc., ABB Kent-Taylor, Amp, Rockwell, Rochester Gas and Electric, and Emerson Corporation, along with several law firms and many of the Industrial Associates of the Institute of Optics.

His doctoral dissertation, carried out at the Institute of Optics under the supervision of Professor Dennis Hall, was in the area of silicon-based optoelectronics with particular emphasis on mechanisms for extrinsic light emission in silicon. Since joining the Institute faculty in 1987, Professor Brown has taught on both the Graduate and Undergraduate levels, established an Undergraduate Honors Research Program, and currently oversees an undergraduate program of approximately 80 students. He received a College of Engineering award for excellence in undergraduate teaching in 1994. His professional affiliations have included the Optical Society of America, SPIE, and the Materials Research Society. He has served as referee for numerous professional journals, and has served on the Technical Program Committee for the Conference on Lasers and Electro-Optics, Photonics West, Optics and Photonics (the annual meeting of SPIE), Opto-Northeast, and Frontiers in Optics (the annual meeting of the OSA); he is currently on the editorial board for the web-based OSA journal Optics Express. He has authored over 60 publications, 10 patents, 3 book chapters, and was an editor for the four-volume Optics Encyclopedia.

Professor Brown is a Fellow of the Optical Society of America, is President-Elect of the Rochester Local Chapter of the Optical Society of America, and currently serves as the Chair of the Polarization Engineering technical group of the OSA. In 2006, he was invited to spend three months at the University of Sydney as the Denison Distinguished Visiting Professor.