



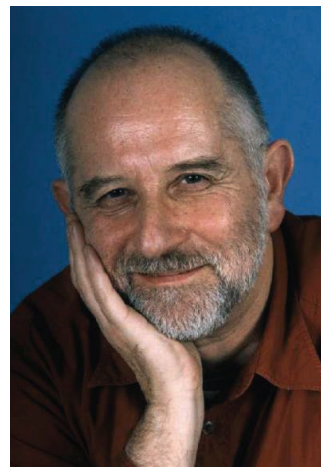
PHYSICS and ASTRONOMY

presents

the 26th Primakoff Lecture

Sir Michael Berry, FRS

Melville Wills Professor of Physics, Emeritus
University of Bristol



Sir Michael Berry is widely known for his studies of the topological aspects of wave motion in classical and quantum scenarios, in particular the geometric phase in adiabatic changes. With extraordinary skill and artistic imagination he has contributed to non-linear dynamics, the quantum aspects of chaos, and the physical interpretation of mathematics. Since taking his Ph.D. at St. Andrews University he has been a member of the Department of Physics at the University of Bristol. He is a fellow of the Royal Society of London and the Royal Society of Edinburgh, and is a foreign member of the National Academy of Sciences. He has won numerous accolades and awards, including the Mawell Medal, the Lilienfeld prize, the Dirac Medal, the Wolf Prize in Physics, the Kapitza Medal, the Onsager Medal, and the Polya Prize.

Hamilton's Diabolical Singularity

Wednesday, April 14th, 2010

4:00 PM

The David Rittenhouse Laboratory, A1

Hamilton's first application of the concept of phase-space - later so fruitful in physics - was a prediction in optics: conical refraction in biaxial crystals. This was one of the first successful predictions of a qualitatively new phenomenon using mathematics, and created a sensation. At the heart of conical refraction is a singularity, anticipating the fermionic sign change underlying the Pauli exclusion principle and the conical intersections now studied in quantum chemistry. The light emerging from the crystal contains many subtle diffraction details, whose definitive understanding and observation have been achieved only recently. Generalizations of the phenomenon involve radically different mathematical structures.

Variations on a Theme of Aharonov & Bohm

Thursday, April 15th, 2010

3:00 PM

The David Rittenhouse Laboratory, A4

The partial anticipation of the AB effect by Ehrenberg and Siday was an approximation whose wavefunction was not singlevalued; its connection with the singlevalued AB wave involves topology: 'whirling waves' winding round the flux. AB is a fine illustration of idealization in physics. There are four AB effects, depending on whether the waves and the flux are classical or quantum; in the classical-classical case, fine details of the AB wavefunction have been explored experimentally in ripples scattered by a water vortex. The AB wave possesses a phase singularity, and there is a similar phenomenon in general interferometers. There are connections between the AB wave and the Cornu spiral describing edge diffraction.

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Colloquium
Lecture