Physics Colloquium

ENTROPY:

CLASSICAL AND QUANTUM

Marlan O. Scully

Baylor, Texas A&M, and Princeton Universities

The entropy concept is both a useful engineering tool and a philosopher's lodestone. Indeed Planck was led to the quantum of action by studying the entropy of thermal light and Einstein was led to the photon concept following Planck's studies. A century later we are still fascinated by (quantum) thermodynamics; For example, the quantum heat engine [1] and the entropy of laser light [2,3] will be discussed.

[1] Scovil Schulz-DuBois, PRL, 1955: "The Maser as a Heat Engine"[2] M. Scully and W. Lamb, PRL, 1965: "The Quantum Theory of the Laser"[3] M. Scully, T.B.P.: "The Entropy of Laser Light"

Thursday

May 4, 2017

4:10PM

LL. 316

Refreshments at 3:45PM

Marlan O. Scully received undergraduate training in Engineering Physics and Nuclear Engineering from the University of Wyoming and Rensselaer Polytechnic Institute and the Ph.D. in Physics from Yale University in 1966. He has held faculty positions at Yale, MIT, University of Arizona, University of New Mexico and the Max-Planck-Institut für Quantenoptik. He presently holds a joint appointment between Texas A&M and Princeton Universities.

He has been instrumental in many seminal contributions to laser science and quantum optics. These include: The Scully-Lamb quantum theory of the laser, the classical theory of the free electron laser, the theory of the laser gyroscope and especially the theory of correlated spontaneous emission noise quenching in such devices, the first demonstration of lasing without inversion and the first utilization of coherence effects to generate ultraslow light in hot gases. Furthermore Scully's work on quantum coherence and correlation effects has shed new light on the foundations of quantum mechanics and yielded new insights into quantum thermodynamics.

He has been elected to the National Academy of Sciences, the Academia Europaea, the Russian Academy of Sciences, and the Max Planck Society and has received numerous awards including the Charles H. Townes Award of the OSA, the Quantum Electronics Award of IEEE, the Elliott Cresson Medal of the Franklin Institute, the Adolph E. Lomb Medal of the OSA, a Guggenheim Fellowship, and the Alexander von Humboldt Distinguished Faculty Prize. More recently, he was awarded the OSA Frederic Ives Medal / Quinn Prize which recognizes overall distinction in optics and is the highest award of the society, was named Einstein Professor by the Chinese Academy of Sciences, and received the Commemorative Medal of the Senate of the Czech Republic.

**prepared by K. Chapin*