Physical Chemistry Seminar

Quantum Acoustics

Solutions to critical high Tc superconductor strange metal mysteries

Eric J. Heller

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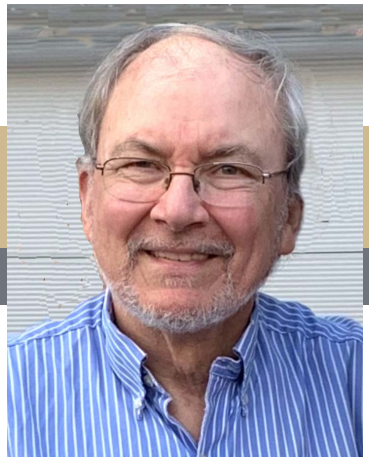

In the 1960's, the wave and particle pictures for light were unified, and the field of quantum optics was born. The link between photon and electromagnetic wave was provided by the Glauber coherent state. Only now is the same scenario playing out for phonons and sound in quantum materials. For far beyond didactic interest, it is solving the decades old mysteries of the high temperature superconductors.

Wednesday, October 2, 2024 **10:30am** **BRWN 4102**

PURDUE UNIVERSITY

James Tarpo Jr. and Margaret Tarpo
Department of Chemistry

Heller Bio

Eric Heller
PhD Chemical Physics, Harvard University 1973
Professor of Chemistry UCLA 1978-84
Staff Scientist, Los Alamos National Laboratory 1982-84
Professor of Chemistry, University of Washington 1984-1993
Professor of Physics, Harvard University 1993-present
Professor of Chemistry, Harvard University, 1999-present

Member,
Americal Academy of Arts and Sciences
Americal Philosophical Society
National Academy of Science

Eric Heller's research has focussed on time-dependent quantum mechanics, scattering theory, and the connections between classical and quantum mechanics. He developed and applied semiclassical wavepacket methods to many problems, including molecular spectroscopy. His work on quantum chaos theory led to his discovering and explaining quantum scars in 1984, Since 1993, he has focussed on solid state problems, starting with the explanation of Don Eigler's quantum corral STM surface electron waves, He explained Bob Westerveldt's 2DEG electron flow SPM images, which led to the field of branched flow. In 2015 he explained the large body of literature on Raman scattering from graphene correctly in terms of Kramers-Heisenberg-Dirac theory. Recently, the high Tc strange metal mysteries, among them perfectly linear in T resistivity, infrared spectroscopic anomalies, and Planckian scattering rate have become clear under the advent of his group's develp[ment of quantum acoustics, the sister of quantum optics.