Satyendra Nath Bose National Centre for Basic Sciences

Azadi Ka Amrit Mahotsav

Visitor, Associates and Students' Programme (VASP) presents Webinar Series on

Quantum Materials & Devices

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TITLE

On the origin and amplitude of the T-square resistivity in Fermi liquids

ABSTRACT

Collisions between electrons generates a contribution to the electric resistivity of metals with a distinct T-square temperature dependence. The amplitude of this term is large in metals hosting either heavy carriers or a low concentration of them. The temperature dependence is known to be set by the size of the scattering phase, but the microscopic source of dissipation is not straightforward. Much insight is provided by making the connection with the case of normal liquid ^{3}He where the T-square temperature dependence of energy and momentum diffusivity is driven by fermion-fermion collisions. The amplitude of T-square resistivity in ^{3}He and in metals share a common scaling indicating that the ubiquitous T-square electrical resistivity ultimately stems from the temperature dependence of momentum diffusivity in Fermi liquids.

SPEAKER

Professor Kamran Behnia, *ESPCI-Paris Science et Lettres University*

Professor Kamran Behnia is a world-renowned experimental condensed matter physicist ESPCI- Paris Science et Lettres University. He received his Ph.D. in 1990 in Grenoble where he worked on thermal transport in heavy fermion superconductor. He spent seven years in Center for Scientific Research (CNRS) working on organic and cuprate superconductors. He joined École Supérieure de Physique et de Chimie Industrielles (ESPCI), Paris in 2000 where he has been leading a group of researchers in the field of unconventional superconductors, superconducting fluctuations, behavior of semimetals beyond quantum limit and magnetoresistance of semimetals among many others. He is the author of the famous book Fundamentals of Thermoelectricity (Oxford University Press, 2015). He became a fellow of American Physical Society in 2012. He has served as a Divisional Associate Editor (DAE) of Physical Review Letters and a member of the Board of Reviewing Editors (BoRE) of the journal Science.