Skoltech
Skolkovo Institute of Science and Technology

When: 16 January, 16:00-17:00
Where: Skoltech, TPOC-3 (Blue bld.), Room 408

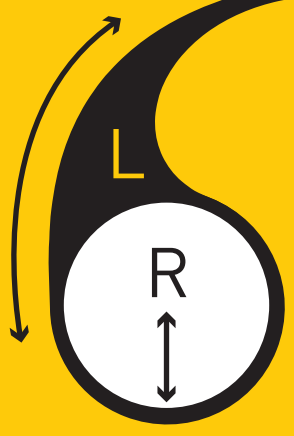
SEMINAR:

QUANTISED FERMI-ARC-MEDIATED TRANSPORT IN WEYL SEMIMETAL NANOWIRES

Speaker:
Dr. Vardan Kaladzhyan
KTH Royal Institute of Technology, Stockholm, Sweden

ABSTRACT

We study longitudinal magnetotransport in Weyl semimetal nanowires. We show that depending on radii of nanowires there are two qualitatively different regimes of transport with respect to the chemical potential in the sample. First, for low doping most of the contribution to conductance comes from the Fermi arc surface states, and thus conductance grows linearly with the chemical potential; the flux dependence changes in steps of one quantum of conductance with characteristic interference oscillations. Second, for highly-doped samples the dominant contribution to conductance is quadratic in the chemical potential, and mostly conditioned by the bulk states; the flux dependence shows clearly that both the surface and the bulk states contribute to conductance. The two aforementioned regimes prove that the contribution of Fermi arc surface states is salient and, therefore, crucial for understanding transport properties of finite-size Weyl semimetal systems.



BIOGRAPHY

I was born in 1991 in Yerevan, Armenia. From 1998 to 2008 I studied at the Moscow State 57th School, and in 2008 I entered the department of physical and quantum electronics at MIPT. In 2014 I defended my master thesis on 'Photogalvanic effects in topological insulators', graduated with honours from MIPT and moved to Paris for Ph.D. studies. Having obtained my Ph.D. degree for 'Spin polarisation and topological properties of Yu-Shiba-Rusinov states' defence in 2017 I moved to Stockholm to become a postdoctoral research fellow specialising in transport in Weyl and Dirac materials.

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