



Institute for Materials Science

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Institute for Materials Science Seminar Series



Dr. Sergey Pershoguba

Nordic Institute for Theoretical Physics (NORDITA)

Postdoctoral Fellow

Skyrmion-induced Bound States in a Superconductor

Wednesday, January 20, 2016

11:00 - Noon

IMS/MPA Conference Room, TA-3, Bldg 32, Rm 134

Abstract: We consider a superconductor proximity coupled to a two-dimensional ferromagnetic film with a skyrmion texture. We predict the skyrmion bound states (SBS) that are induced in the superconductor, similar to the well-known Yu-Shiba-Rusinov (YSR) states. Using the T-matrix calculations and numerical modeling we calculate the spin-polarized local density of states in the superconductor in the vicinity of the skyrmion. The SBS wavefunctions have spatial power-law decay. Presence of the SBS suggests the mechanism by which superconductivity could facilitate an effective long-range interaction between skyrmions when their SBS wavefunctions overlap.

(preprint: arXiv:1511.01842)

Bio: Sergey Pershoguba received his PhD from the University of Maryland in the summer of 2014. Dr. Pershoguba is interested in various aspects of condensed matter theory, such as: topology and geometry in condensed matter physics, effects of a strong magnetic field in solids, electromagnetic response of novel materials, etc. At Nordita, Sergey is pursuing research in Dirac materials, such as graphene, topological insulators and superconductors.

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*Hosted by Alexandar Balatsky * Director of the Institute for Materials Science*