10:48AM E39.00011: Magnetically controlled geometry of flexible ferromagnetic rings KOSTIANTYN YERSHOV (Presenter), Leibniz Institute for Solid State and Materials Research, IFW Dresden, D-01171 Dresden, Germany, DENIS D. SHEKA, Taras Shevchenko National University of Kyiv, 01601 Kyiv, Ukraine, VOLODYMYR P. KRAVCHUK, Leibniz Institute for Solid State and Materials Research, IFW Dresden, D-01171 Dresden, Germany, AVADH SAXENA, Theoretical Division and Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, NM 87545, USA, YURI GAIDIDEI, Bogolyubov Institute for Theoretical Physics of National Academy of Sciences of Ukraine, 03143 Kyiv, Ukraine — We propose a minimal extension of the anisotropic Heisenberg model in order to describe flexible magnetic wires (rings) [1]. Flexible ferromagnetic wires are spin-chain magnets, in which the magnetic and mechanical subsystems are coupled. The coupling between the magnetic and mechanical subsystems is driven by uniaxial anisotropy with the easy-axis oriented along the tangential direction. First, we show that depending on the magnetic and elastic parameters and the size of the system one can obtain two different states: the onion state with the quasi-uniform magnetization is typical for small enough rings, while the vortex state with the magnetization oriented tangential to the wire is preferable for large systems. Second, we demonstrate that according to the system symmetry there can appear normal modes with zero frequency (i. e. zero modes) on the background of equilibrium states. [1] Yu. Gaididei et al, arXiv:1809.10622 (2018).

Tuesday, March 5, 2019 8:00 AM - 10:48 AM

Session E40 GMAG DMP: Magnetic Excitations in Oxides BCEC 208 - Sachith Dissanayake, Duke University - Tag(s): Focus

8:00AM E40.00001: Optical signatures of a 3D electronic liquid crystal in $Cd_2Re_2O_7$ [Invited] DAVID HSIEH (Presenter), Physics, California Institute of Technology — In the presence of strong interactions, the fluid of mobile electrons in a metal can spontaneously break the point group symmetries of its underlying host lattice, forming an electronic analogue of a classical liquid crystal. The experimental discovery of 2D electronic liquid crystals (ELCs) was first made nearly 20 years ago in semiconductor heterostructures and has since been reported in many other systems including the copper- and iron-based high-temperature superconductors. However whether or not a 3D version of an ELC can exist has remained unclear. In this talk, I will present signatures of a 3D ELC in the strongly spin-orbit coupled metallic pyrochore $Cd_2Re_2O_7$ detected using ultrafast coherent phonon spectroscopy and a recently developed spatially-resolved nonlinear optical polarimetry technique.

8:36AM E40.00002: Nature of magnetic excitations in the spin-1/2 triangular antiferromagnet $Ba_3CoSb_2O_9$ in applied magnetic field* LUWEI GE (Presenter), School of Physics, Georgia Institute of Technology, QING HUANG, Department of Physics and Astronomy, University of Tennessee, Knoxville, TAO HONG, Oak Ridge National Laboratory, HAIDONG ZHOU, Department of Physics and Astronomy, University of Tennessee, Knoxville, JIE MA, Department of Physics and Astronomy, Shanghai Jiao Tong University, MARTIN MOURIGAL, School of Physics, Georgia Institute of Technology — $Ba_3CoSb_2O_9$ is one of the very few experimental realizations of the spin-1/2 triangular antiferromagnets. Despite the model being extensively studied, a unified understanding of the compound's zero-field magnetic excitations has not yet been achieved. Spin-wave theory up to $1/S$ correction clearly failed to describe the whole picture. However, whether this is indeed due to the intrinsic nature of the spin Hamiltonian remains debatable. Seeking more experimental evidence, we investigated the system's field-induced states with inelastic neutron scattering, particularly in the low-field regime. While revealing some yet unexplained features, our results show some strong damping of the excitation branch around K point, consistent with the field-induced magnon decay scenario. Our results are expected to help obtain a better understanding the system.

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