

Date: November 26 (Tue), 13:30~14:30

Location: 1F 115 Room at KEK Tokai #1 Building

Speaker: Dr. Igor A. Zaliznyak

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Title: Science opportunities using the neutron polarization analysis at HYSPEC

Abstract:

HYbrid SPECtrometer (HYSPEC) is a (sub)thermal time-of-flight (TOF) neutron instrument at the Spallation Neutron Source at Oak Ridge National Laboratory (USA), which from the very inception was designed and constructed to allow the full polarization analysis (PA) in TOF inelastic neutron scattering [1]. Recently, PA on HYSPEC has been commissioned and it is now fully operational as a mainstay mode in the user program [2,3]. I will present an overview of the instrument design, which employs Heusler crystals to polarize the incident beam and a supermirror transmission polarizer for the polarization analysis, and will discuss the principles and important features of HYSPEC polarized beam operation. With the large intensity loss in the polarized mode, the accurate data reduction using the specially designed algorithms based on the Mantid [4] software package becomes extremely important [5]. Since the first commissioning experiments in 2016 [3], a number of successful measurements employing PA have been carried out at HYSPEC. I will present some of these measurements, including magnetic and lattice excitations in iron chalcogenide superconductor, $\text{FeTe}_{1-x}\text{Se}_x$, and its parent material, Fe_{1+y}Te , and the triplet magnons in spin-5/2 chain system. The results reveal exciting new science opportunities provided by TOF PA at HYSPEC, which allows polarization discrimination while surveying large volumes of system's phase.

[1] I. Zaliznyak et al., *Physica B* 356, 150-155 (2005).

[2] B. Winn et al., *EPJ Web of Conferences*, 83, 03017 (2015).

[3] I. A. Zaliznyak et al., *J. Phys.: Conf. Series* 862, 012030 (2017).

[4] O. Arnold et al., *Nucl. Instr. and Meth. in Phys. Res. A*, 764, 156 (2014).

[5] A. Savici et al., *J. Phys.: Conf. Series* 862, 012030 (2017).

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