

## HYSPEC News - September, 2016.

Dear HYSPEC ID Team members and friends,

The deadline for the next SNS proposal round 2017-A is approaching in about a week from now, on October 5, 2016, see <http://neutrons.ornl.gov/users> and <http://neutrons.ornl.gov/users/proposals> for details. Now is a good time to prepare your HYSPEC proposals. The procedure of submitting proposals via IPTS remains the same as in the past cycles. Note that a new revision of the proposal template (REV 07-27-2016) has been included with the proposal call email circulated by the SNS. Please also note that in view of the upcoming 4-months SNS outage, which begins at the end of March, 2017 (see [ORNL Neutron Times](#) for details) there will be reduced time available in 2017-A cycle.

HYSPEC polarized beam option is now fully commissioned and routinely operational. The credit goes to HYSPEC team, O. Garlea, B. Winn, A. Savici and M. Graves-Brook. The operation in polarized beam mode is rather straightforward and easy for the user. Despite a marked loss of intensity compared to the un-polarized mode, measurements performed during the past cycle show very encouraging results, indicating that a survey of an inelastic spectrum of a few gram sample with sample rotation of  $\sim 200$  degrees is feasible in about 1-1.5 days for each polarization and guide field setting. Note that HYSPEC polarized beam setup allows full XYZ polarization analysis. Do not hesitate to submit experiments that require polarization analysis for scattered energies up to 20 meV!

### HYSPEC INSTRUMENT STATUS UPDATE

The (XYZ) polarization analysis option is now included as a regular HYSPEC option in the user program. The first polarized beam experiments indicate that a survey of an inelastic spectrum of a few gram sample with sample rotation of  $\sim 180$ - $270$  degrees is feasible in about 1-1.5 days for each polarization and guide field setting. The principal limitations of the polarized mode are (i) a small, only 6-12 mm (depending on the scattered neutron energy) sample scattering volume accepted by the radial supermirror polarizer, and (ii) its rather low and energy-dependent transmission, which falls below 10% above 20 meV.

The first HYSPEC polarized beam results have stirred significant interest in the community. They were presented in two invited talks, (by I. Zaliznyak at the PNCMI Conference in Munich and by O. Garlea at the ACNS in Long Beach) and in contributed talks by other HYSPEC team members (B. Winn, A. Savici, I. Zaliznyak). Some of these results will be summarized in the Conference proceedings.

As a reminder, among the great advantages that polarized measurements on HYSPEC offer not the least are the stability and the ease of operation – essentially it is nearly a “push button” option requiring no special dedicated technical support. Another significant benefit is that in the direct time-of-flight method implemented on HYSPEC the elastic scattering channel is acquired along with the inelastic data, and therefore provides the flipping ratio measurement whenever Bragg intensities are measured. A possibility of obtaining a full three(four)-dimensional survey of spin-flip and non-spin-flip scattering for three directions of guide field (XYZ polarization analysis) affords additional leverage in discriminating between

magnetic and non-magnetic features, which now appear as patterns in the phase space, and therefore can be rather easily distinguished even under the conditions of low flipping ratio, such as when sample is superparamagnetic, or superconducting, and depolarizes the beam.

Finally, the sample environment that can be accommodated inside the Helmholtz coils at the sample table in the polarized setup includes HYSPEC standard closed-cycle refrigerators (5 to 600 K) and the liquid-helium "orange" flow cryostat with base temperature below 2K.

## **IDT STATUS UPDATE**

HYSPEC IDT is preparing to file the next IDT report with the SNS in October of 2016. We are also preparing for the tri-annual review of the IDT by the SNS-appointed review Committee, which will address the IDT scientific output and impact on the performance of the instrument in the user program. The Committee will then make recommendations to the SNS as to whether to extend the SNS-IDT agreement based on the following criteria:

- Best interest of the General User Program
- Scientific Impact
- Future development

IDT members: please communicate your results and contributions addressing the above criteria to the SNS, and to the IDT Executive Committee.

For the most current news and information about HYSPEC, please visit the HYSPEC IDT website at BNL, <http://neutrons.phy.bnl.gov/HYSPEC>, or the ORNL SNS HYSPEC site, <http://neutrons.ornl.gov/hyspec/>.

With best regards,

Dr. Igor Zaliznyak

Physicist, Neutron Scattering  
Condensed Matter Physics & Materials Science Department  
BLDG 734, ISB  
Brookhaven National Laboratory  
Upton, NY 11973-5000.  
Phone: (1 631) 344 3761  
FAX: (1 631) 344 2739  
Email [zaliznyak@bnl.gov](mailto:zaliznyak@bnl.gov); [igor@neutrons.phy.bnl.gov](mailto:igor@neutrons.phy.bnl.gov)