

HYSPEC NEWS – June 2012

Dear HYSPEC Team Members,

As all of us have been expecting for years, HYSPEC construction was completed on schedule, with the DOE review granting the CD-4 decision in July of 2011. Congratulations go first of all to Mark Hagen, who led the construction as the instrument lead scientist, to Barry Winn (instrument scientist) and Melissa Graves-Brooks (instrument associate, who joined Mark in 2010), to the BNL Instrument Design Team (W. Leonhardt, who provided large part of the design engineering, V. Ghosh who did the extensive Monte-Carlo simulation work, L. Passell who provided invaluable expertise and intellectual guidance, the PI's – S. Shapiro and I. Zaliznyak), the SNS support team, as well as to all of you – we've got the instrument we dreamed of!

Now HYSPEC is in testing and commissioning, and the SNS instrument team has done a truly impressive job in putting the hardware and software together to make the spectrometer work as envisioned and to meet the IDT expectations outlined in the original proposal. First friendly user experiments have already begun producing exciting new science, largely proving the instrument's outstanding performance and great potential.

The most current news and information about HYSPEC can be found on the HYSPEC IDT website at BNL, <http://neutrons.phy.bnl.gov/HYSPEC/>, - please, check it out!

HYSPEC TEAM UPDATE

Following the reorganization of the ORNL Neutron Science Directorate in December of 2011, Mark Hagen was promoted to the Group Leader position of the Data Analysis and Visualization Group. Although it is difficult, if not impossible to find a matching replacement for Mark as the HYSPEC lead scientist, SNS is looking for a candidate to fill the HYSPEC scientist position (<http://jobs.ornl.gov>, ref. Quantum Condensed Matter Instrument Scientist-NB50304628). Fortunately, Mark is still greatly involved with HYSPEC and works closely with Barry Winn who currently remains the lone HYSPEC instrument scientist. During the transition, Mark Lumsden, who is the new Leader of the Time-of-Flight Spectroscopy Group, is also contributing to the scientific leadership of the SNS HYSPEC Team.

It is also extremely important that the expertise and experience of the HYSPEC IDT members be transferred to the SNS and deployed in designing and refining the instrument operating procedures, its further improvements and tune-ups. To this end we have initiated a series of HYSPEC Memos. These are modeled on similar technical memorandums which existed at the HFBR during its operation, and many of which were described in an excellent book on Triple Axis Spectroscopy by [Shirane, Shapiro and Tranquada](#)). Each memo is intended to present a particular technical finding or feature (such as a spurion, a favorable or unfavorable experimental condition, etc.) which could be useful for other experimenters and for the HYSPEC team. These memos are informal and are aimed at concise exposition of useful technical data and information. For the first examples, please check

http://neutrons.phy.bnl.gov/HYSPEC/memos_technical_reports.shtm.

IDT EXECUTIVE COMMITTEE INAUGURAL MEETING - 2011

In October of 2011 the IDT Executive Committee held an inaugural meeting at the SNS, where the final construction update was presented by the HYSPEC SNS Team (M. Hagen, B. Winn, M. Graves-Brooks). The Committee members also discussed plans for the initial test experiments to be conducted in early 2012 before the SNS summer shutdown. You may find the details by visiting http://neutrons.phy.bnl.gov/HYSPEC/IDT/Executive_Committee/HYSPEC_EC_Oct2011.pdf.

HYSPEC COMMISSIONING AND TESTING ACTIVITIES

The HYSPEC shutter was first opened in August of 2011, and the instrument has entered the period of testing, debugging, and commissioning. Since early April 2012 the software and hardware reliability have reached the stage where scientific measurements could be conducted. Several IDT members, including the HYSPEC PIs, have invested their effort and time in performing these risky initial studies. Impressively, many of these initial experiments were rewarded by significant scientific results, confirming the great potential of HYSPEC. Some of these experiments are described in the [April-May 2012 HYSPEC update](#) prepared by Barry Winn. For more updates, please visit http://neutrons.phy.bnl.gov/HYSPEC/HYSPEC_news_archive.shtm.

Although the complete set of results from HYSPEC testing, flux and calibration measurements is still being analyzed and compiled, some interesting preliminary findings were reported in B. Winn's presentation at the American Conference on Neutron Scattering in Washington, DC in June of 2012 (check <http://neutrons.phy.bnl.gov/HYSPEC/presentations.shtm>).

The latest commissioning activity carried out before the SNS summer shutdown was the testing of the polarization of the incident neutron beam provided by the Heusler crystals. These tests (albeit conducted without vertical focusing) revealed flipping ratios of about 25, fully conforming to the design specs. In view of the known difficulties experienced by similar Heusler crystal setups elsewhere, it is hard to overemphasize the role that Mark Hagen's experience played in preparing the technical description of the Heusler order, which was the key in achieving this result. These tests also heavily relied on the recent advances in the polarized ³He technology achieved at the SNS by Tony Tong Xin. Some of the results were included in Tony's presentation at the ACNS-2012, and the preliminary report is included in the [June 2012 HYSPEC update](#) by Barry Winn.

FUTURE PLANS – 2012 AND BEYOND

Plans for the fall of 2012 will include continuing the commissioning and test experiments, fully engaging the IDT membership. A limited (unpolarized) beam time on HYSPEC is included in the upcoming SNS proposal call 2013-A, with experiments beginning in early 2013. By that time the IDT should have a seed science program established and be in a position to leverage the IDT beam time to maximize the scientific output. To this end, we encourage the IDT members to think of the initial phase experiments to be carried out and submit a short (1-2 paragraphs) description of the science case for the proposed experiment(s) to zaliznyak@bnl.gov or shapiro@bnl.gov. An Executive Committee

meeting (an IDT meeting is preferable, but no funding is available to support members travel) will be held in the fall, probably following the Neutron Scattering Proposal Selection Committee meeting at the SNS, where these proposals will be considered and coordinated.