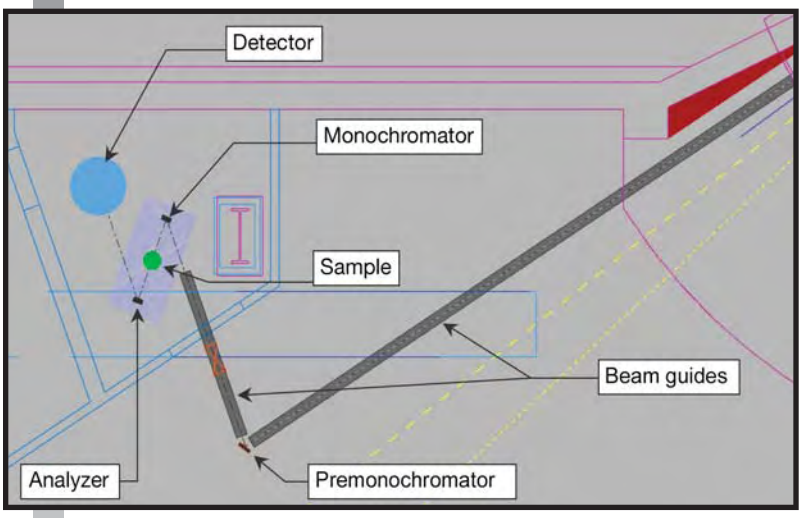
INSTRUMENT Fact Sheet

BEAM LINE 1A

SPALLATION NEUTRON SOURCE

TOF-USANS – TIME-OF-FLIGHT ULTRA-SMALL-ANGLE NEUTRON SCATTERING INSTRUMENT

The TOF-USANS instrument is designed for the study of hierarchical structures in natural and man-made materials. It can be considered an advanced version of the classical Bonse-Hart Double-Crystal Diffractometer (DCD), which, in contrast with its single-wavelength reactor-based analog, will operate with the discrete multiwavelength spectrum of Bragg reflections. The optical scheme of the TOF-USANS instrument is similar to that of the conventional Bonse-Hart DCD; however, the pulsed nature of SNS offers an opportunity to separate the orders of Bragg reflection in time space using the time-of-flight technique. Thus, the concept of the TOF-USANS technique allows optimization of the neutron flux and the Q resolution, following the principles of dynamical diffraction theory.



Discrete multiwavelength spectrum created by a family of Bragg reflections.

SPECIFICATIONS

Moderator	Decoupled poisoned hydrogen
Source detector distance	25 m
Focusing premono-chromator	Bent sapphire (1120) crystal
Monochro-mator and analyzer	Si(220) channel-cut, triple-bounce crystals
Bragg angle	70°
Wavelength spectrum	7 Bragg reflections at 3.6, 1.8, 1.2, 0.9, 0.72, 0.6, 0.51 Å
Q range	$2\ 10^{-6}$ Å^{-1} < Q < $5\ 10^{-3}$ Å^{-1}

Status:
To be commissioned in 2013

FOR MORE INFORMATION, CONTACT

Instrument Scientist: Michael Agamalian, magamalian@ornl.gov, 865.576.0903

May 2008

06-G01637B/arm