

SNS-Magnetism Reflectometer Initial Measurements

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The SNS Magnetism Reflectometer is one of the first three operational SNS instruments. Its construction was completed in May 2006 and the first data sets were collected in July 2006, shortly after passing the instrument readiness safety review. The beamline commissioning proceeds in parallel to the power ramp up of the SNS accelerator. While the initial reflectivity measurements were taken with only 250 Watts of proton power, by mid November 2006 proton power had already increased to 60 kW, making the SNS the most intense pulsed neutron source on a per pulse basis and in August 2007 by running at 185kW became the most intense source in the world. In this presentation, initial commissioning results for the Magnetism Reflectometer, in particular beam intensity/divergence measurements, tests of the polarized neutron equipment (super mirror polarizer, RF spin flippers) as well as transmission measurements of the bandwidth limiting chopper systems and some science reflectivity measurements are presented. Reflectivity data for magnetic MgO and Si₃N₄/Mn¹ multilayer will be discussed in this presentation. The magnetic MgO:N(2.2%)² is a system that is doped with 2.2% Nitrogen there by introducing a local magnetic moment of about 8emu/cc. The SNS Magnetism Reflectometer on beamline 4A shares a common primary beam port and shutter with the SNS Liquids Reflectometer (BL4B) from which it is separated by 4.8° in horizontal angle. Individual secondary shutters allow operating the two instruments independently.

¹ Si₃N₄/Mn multilayer sample is provided by Suzanne te Velthuis , ANL and Eva C. Montoya, Magnéticas y de Transporte Instituto de Ciencia de Materiales de Madrid - C.S.I.C.Campus de Cantoblanco, Madrid, Spain.

²MgO:N(2.2%) sample is provided by Stuart Parkin's group at IBM, Almaden.