

Discover: A Total Scattering Diffractometer for Materials Discovery at the SNS

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The materials, physics, and chemistry research communities have long championed the total scattering diffractometer DISCOVER as an ideal instrument for Beamline 8b at the First Target Station of the Spallation Neutron Source (SNS) at Oak Ridge National Laboratory. As a total scattering neutron powder diffractometer, DISCOVER will be optimized for studying real materials in their operating environments, supplying the scientific community with a platform for front-line investigations of the delicate interplay of global and local symmetries, for examining how order evolves from the atomic to macroscale, and for discovering how these features respond to external perturbation to deliver new functionality. As such, DISCOVER will fill critical capability gaps for the advancement of next generation materials of all kinds, including quantum materials, catalysts and sorbents, energy storage materials, advanced alloys, and more. In this contribution we will present the design criteria, engineering concept, and neutronics performance simulations of the DISCOVER concept, inviting feedback from the scientific user community.

Figure Caption: Design layout for DISCOVER at Beamline (BL) 8b at the First Target Station of the Spallation Neutron Source, Oak Ridge National Laboratory.

