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Testing of the Second Target Station In-Monolith Optics Alignment Process

Similar to other neutron scattering facilities around the world, Oak Ridge National Laboratory's Second Target Station (STS) will require beamline optics to be blindly installed into its central monolith. For STS, this installation involves three types of modules: 1) Monolith Inserts which provide a helium environment for the optics and isolate the target vacuum environment, 2) Optics Modules which provide a way to assemble and align multiple in-monolith neutron guide elements, and 3) internal Shield Plugs that fill the Monolith Insert cavities for initially unpopulated beamlines. An alignment scheme and an insertion tool (also called the "Cold Handler") has been designed that can place each module type within the monolith during facility construction; a remotely-operable "Hot Handler" will be developed for installations after beam operations begin. Since only the downstream end of each module will be accessible after installation, accurate placement of the upstream ends of each module cannot be confirmed for the actual instruments. Optics alignment is critical on STS beamlines due to the small beam cross-sections, so a full-scale Monolith Optics Test Stand was built to validate the proposed alignment process and test the functionality of the Cold Handler. A description of the process and the results of that testing will be presented.

Primary author: Ms WILSON, Danielle (ORNL)

Presenter: Ms WILSON, Danielle (ORNL)

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