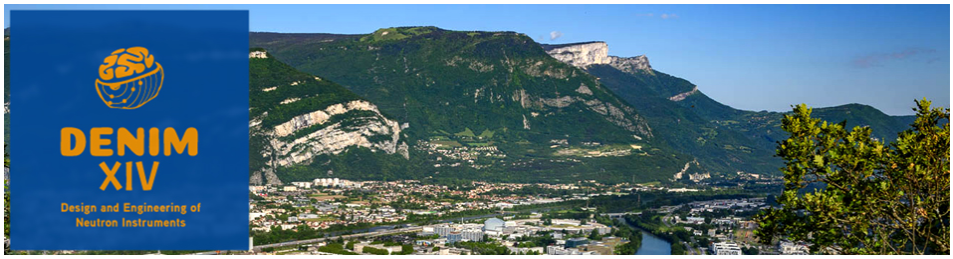

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Mechanical Design of the Beam-Splitting for Neutron Backscattering Spectrometer in CSNS

Wednesday, 22 October 2025 14:12 (1 minute)

The neutron backscattering spectrometer (NUBS) currently under construction at China Spallation Neutron Source (CSNS) Phase II project will become the facility's longest spectrometer, featuring a 90-meter moderator-to-sample distance. Utilizing Channel 10, this spectrometer implements an beam-splitting guide design to simultaneously accommodate the NUBS operation and a future 10A beamline, requiring specialized mechanical solutions to overcome spatial constraints in both the first shutter and bulk insert regions.
Key design features include:
1. Dimensional specifications with NUBS guides measuring 60 × 90 mm (W×H) and 10A beamline guides at 25 × 50 mm, arranged with a 1.8° separation angle (0.6° deflection for NUBS away from Channel 9 versus 1.2° opposite deflection for 10A).
2. First shutter integration:
(1) Initial 500 mm shared tapered guide section
(2) Monolithic assembly combining NUBS guide, 10A guide, and shared section
(3) Prefabricated as complete unit by SwissNeutronics for simplified alignment in CSNS
3. Bulk insert configuration:
(1) Single-unit installation and alignment
(2) Fixed NUBS guide as reference
(3) 10A guide equipped with precision height/horizontal adjustment mechanisms
(4) Offline calibration ensuring proper relative positioning between NUBS guide and 10A guide before final installation
4. Post-bulk insert arrangement:
(1) Fully separated guide systems between NUBS guide and 10A
(2) Independent adjustment mechanisms for each guide
Installation and alignment of these systems are scheduled for completion in summer 2025.

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