Contribution ID: **60** Type: **Poster**

A Laser-based Alignment Method for the Multi-slits VSANS in High Precision

A multi-slit (MS) Very Small Angle Scattering (VSANS) instrument is now under construction on Beam Line 14 in China Spallation Neutron Source (CSNS). It is an upgrade of traditional SANS that extends the measurement length scale up to 1 micrometer. Success of the instrument depends on the precise alignment of the millimeter width MSs over more than 12 m. A laser-based non-contact alignment technique is proposed. When the expanded laser beam images MS directly to a high-resolution CCD, relative positions of each MS perpendicular to the beam line can be further aligned precisely. The transverse deviation of the 12 MSs can be kept within ±5 μm. High accuracy of the technique guarantees the success of the VSANS instrument, and can be applicable to other systems that need high lateral precision over long distance.

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Track Classification: Instrumentation