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Measurements at peak operational beam current in the SNS beam test facility

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Work at the SNS beam test facility has focused on high dimensional and high dynamic range measurements of the medium energy (2.5 MeV) beam distribution. This is motivated by the need to understand and predict beam losses down to one-part-per-million. The initial demonstration of full-and-direct 6D phase space measurement was done at a current of 40 mA transported through the RFQ. Since that demonstration, more detailed studies have been performed at lower transported currents (in the range 30 mA and below). This is due to a hardware change - recent runs utilize the original SNS RFQ, which after a decade of service in the SNS achieves transmission significantly below design (50-60%, vs >80%). A short run in 2023 with a newly-commissioned RFQ enables maximum transmission. Preliminary results from beam distribution measurements during this run are discussed.

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Footnotes

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