

SNS TRANSVERSE AND LONGITUDINAL LASER PROFILE MONITOR DESIGN, IMPLEMENTATION, RESULTS, AND IMPROVEMENT PLANS

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Abstract

SNS is using a Nd:YAG laser to measure transverse profiles at nine-stations in the 186–10⁰ MeV Super-Conducting LINAC (SCL) and a Ti:Sapphire mode-locked laser to measure longitudinal profiles in the 2.5 MeV Medium Energy Beam Transport (MEBT). The laser beam is scanned across the H⁻ beam to photo-neutralize narrow slices. The liberated electrons are directly collected to measure the transverse or longitudinal beam profiles. We have successfully measured the transverse and longitudinal profiles at all stations. The SCL laser system uses an optical transport line that is installed alongside the 300 meter super-conducting LINAC to deliver laser light at nine locations. Movement of the laser light in the optical transport system can lead to problems with the profile measurement. We are using telescopes to minimize the oscillations and active feedback system on mirrors to correct the drifts and movements. In this presentation we discuss our implementation and beam profiles measured during SCL commissioning. We also discuss future improvements, drift and vibration cancellation system, as well as plan to automate subsystems for both the transverse and the longitudinal profiles.

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