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Physics considerations for a harp system design at the Second Target Station of the Spallation Neutron Source

Monday 11 August 2025 16:00 (2 hours)

A harp system is being developed for monitoring proton beam profile direct upstream of the proton beam window at the Second Target Station of the Spallation Neutron Source, Oak Ridge National Laboratory. It consists of two sensor planes which have arrays of thin conducting wires aligned vertically and horizontally, respectively. It monitors beam profiles in two transverse directions to the beam axis by measuring the net-charge depositions in the sensor wires, which are caused by ejection of secondary electrons and delta rays driven by electromagnetic interactions with high-energy protons. The net charge deposition in a sensing wire linearly correlates with the number of incident protons on it. This correlation is perturbed when the wire interacts with secondary electrons and delta rays originating from beam-matter interactions in neighboring wires, PBW and residual gases. In this paper, we analyze the physical phenomena that affects the measurement uncertainties of the harp using particle transport simulations.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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