

Date: 02/05/2024
To: Dianne Ezell, Lorenzo Fabris, and members of the Nab Collaboration
From: Leah Broussard

Subject: Review of the Nab Detector Electronics

The Nab experiment successfully took commissioning data for the first time in the summer of 2023. This highly successful run revealed some issues with the detectors and readout electronics that need to be addressed during the present long shutdown of the SNS if the experiment is to meet its intended precision. On October 26, 2023, a review was held on the Nab detection system which resulted in several recommendations for corrective actions. We invite you to participate in a review on February 8, 2024, focusing specifically on the progress and plans for remediations for the two highest priority Nab detector electronics issues: electronics stability and failures resulting in non-working channels. The purpose of the review is to examine the investigative studies performed and assess the feasibility of the proposed remediation to ensure that the experiment meets its targeted sensitivity capability before the startup of the SNS, in July 2024.

Specifically, the reviewers are requested to address the following subjects:

1. **Stability investigation:** The studies performed to investigate the contributing factors to the onset of oscillations will be presented, which address recommendations #1-3 from the October Review. Suggestions from the reviewers for further investigation and interpretation of results are appreciated.
2. **Remediation strategy:** A staged approach to address electronics instability and to improve channel readout survivability will be presented, to address recommendations #11-12 from the October Review. Is the proposed strategy the one most likely to meet the immediate and long-term goals of the Nab experiment?
3. **Pixel mapping improvements:** A proposed redesign of boards which map pixels to channels will be presented, intended to reduce impact of electronics oscillations. The redesign will address recommendations #6-7 from the October Review. We request a mail review of the design before it is procured.

I would appreciate receiving recommendations in the form of a powerpoint presentation as soon as possible after the end of the review and after layout design files are provided. If you have any questions, please contact Leah Broussard, on-site experiment manager (865-574-4497), or Stefan Baeßler, experiment manager (434-243-1024).