

# A study on the feasibility of CSNS becoming an ATLAS ITk sensor QA irradiation site

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The current ATLAS Inner Detector will undergo a complete upgrade in order to meet the requirements of the High Luminosity Large Hadron Collider (HL-LHC). The new Inner Tracker (ITk) will be made completely of silicon sensors fabricated by Hamamatsu Photonics K.K. (HPK). Quality Assurance (QA) is focused on providing confidence that quality requirements will be fulfilled in production such as irradiation tolerance and testing specification for the mini sensors. The Associated Proton beam Experiment Platform (APEP) beam line at the China Spallation Neutron Source (CSNS) commissioned in 2022. This study focused on verifying the feasibility of CSNS as an ITk sensor QA irradiation site. A low-temperature peltier cold box has been developed to keep the irradiation sensor samples at  $-15^{\circ}\text{C}$ . Several fluence points have been studied from  $5.1 \times 10^{14}$  to  $1.6 \times 10^{15}$  neq/cm<sup>2</sup>, measured by the aluminum sheet. The post-irradiation measurements (IV, CV, and CCE) are done after annealing for 80 minutes at  $60^{\circ}\text{C}$  under the cold temperature ( $-8^{\circ}\text{C}$ ). Test results show CSNS could be a suitable proton irradiation site for the ATLAS ITk sensor project.

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