

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

Thursday 7 September 2023 14:40 (10 minutes)

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°C . Several fluence points have been studied from 5.1×10^{14} to 1.6×10^{15} neq/cm², measured by the aluminum sheet. The post-irradiation measurements (IV, CV, and CCE) are done after annealing for 80 minutes at 60°C under the cold temperature (-8°C). Test results show CSNS could be a suitable proton irradiation site for the ATLAS ITk sensor project.

Your name

Hui Li

Institute

Tsinghua University

Email address

hui.l@cern.ch

Author: LI, Hui (Tsinghua University (CN))

Co-authors: ITK STRIP SENSOR COLLABORATION, ATLAS; SHI, Xin (Chinese Academy of Sciences (CN)); UNNO, Yoshinobu (High Energy Accelerator Research Organization (JP)); FADEYEV, Vitaliy (University of California, Santa Cruz (US)); ULLAN, Miguel (CNM-Barcelona (ES))

Presenters: LI, Hui (Tsinghua University (CN)); LI, Zhan (Chinese Academy of Sciences (CN))

Session Classification: Poster Session III

Track Classification: Applications in Particle Physics