

Development of Radiation-hard LGAD at USTC

Tuesday, 17 August 2021 09:20 (15 minutes)

In this talk, the recent progress of the development of the Low-Gain Avalanche Detector (LGAD) at the USTC will be presented. The talk covers production and characterisation of the USTC LGADs. The LGADs, with its internal gain mechanism which can provide a signal with fast rising time, resulting in a time resolution of about 30 ps. The thin active layer reduces the Landau noise and makes it possible to fully deplete the detector after extremely high non-ionizing irradiation fluence ($6 \times 10^{15} / \text{cm}^2$ 1 MeV-neq). The HGTD project in the ATLAS Phase-II upgrade adopts the LGAD as the sensor technology and USTC is involved in the development and optimization of this technology. Several measures, including carbon diffusion and deep gain layer implantation, have been attempted and compared. Now the gain layer acceptor removal rate (c-factor) of USTC sensors is close to the most irradiation-hard sensors produced by the FBK, and is better than sensors from other vendors to date, proving the effectiveness of the strategy.

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Session Classification: Parallel Session V: Particle Detector Technology

Track Classification: 5. 粒子物理实验技术