3rd DRD3 week on Solid State Detectors R&D



Contribution ID: 4

Type: WG2 - Hybrid silicon sensors

Timing Measurements for 3D and LGAD Sensors Using ⁹⁰Sr

Thursday 5 June 2025 08:30 (20 minutes)

To evaluate the timing performance of the 3D detector, we developed a readout system for silicon detectors, taking inspiration from the Gali-66+ used by the Energy Frontier group in Japan. To better understand the working principle of a transimpedance amplifier (TIA) based on BJT transistors, we also referred to a TIA design developed by UCSC using a BFP840ESD (SiGe) transistor.

In this study, we used a ⁹⁰Sr source to generate signals in both 3D and AC-LGAD detectors. We first present the timing resolution results for the 3D and AC-LGAD detectors. Then, based on the basic amplification principle of the TIA, V=IR, we varied the resistance R to investigate its impact on the pulse maximum, rise time, and RMSD. These characteristics were analyzed for the BFP840ESD (SiGe)-based design and compared with the Gali-66+.

If you have any suggestions or questions, please let me know —any feedback is very welcome.

Type of presentation (in-person/online)

online presentation (zoom)

Type of presentation (I. scientific results or II. project proposal)

I. Presentation on scientific results

Authors: BETANCOURT, Christopher (KEK High Energy Accelerator Research Organization (JP)); Prof. BOR-TOLETTO, Daniela (University of Oxford (GB)); NAKAMURA, Koji (KEK High Energy Accelerator Research Organization (JP)); TOGAWA, Manabu (KEK High Energy Accelerator Research Organization (JP)); LIAO, chuan (The High Energy Accelerator Research Organization)

Presenter: LIAO, chuan (The High Energy Accelerator Research Organization)

Session Classification: WG2/WP2 - Hybrid Silicon Technologies