ID de Contribution: **129** Type: **Poster**

An innovative Monolithic Silicon Carbide ΔE–E Telescope

Silicon carbide (SiC) has emerged as a promising material for radiation detection in harsh environments, thanks to its wide bandgap, excellent radiation hardness, low leakage current, and suitability for high-temperature operation. These properties make SiC detectors attractive candidates for applications where conventional silicon detectors face significant limitations, such as fusion diagnostics or high-fluence experiments.
Within the framework of the SiCILIA project, a new generation of large-area, high-purity, thick p/n junction SiC detectors has been developed and extensively tested. These detectors have demonstrated excellent energy resolution, efficient particle identification, and resistance to radiation damage when exposed to particles with high fluence [1,2].
Building upon these results, and following previous efforts in monolithic telescope design [3], an integrated ΔE–E SiC detector telescope with an ultrathin ΔE stage (1 μm) and a thin E stage (10 μm) has been developed, aiming to exploit their capabilities for particle identification over a wide energy range.
In this contribution, the design, fabrication, and preliminary characterization results of the first prototypes of monolithic SiC telescopes will be presented. The detector has been characterized in terms of energy response, ΔE–E correlation, and signal processing optimization. In particular, shaping time studies were performed to mitigate interstage signal induction, improving energy resolution and ΔE–E correlation quality.

[1] Tudisco, Salvatore, et al. "SiCILIA—silicon carbide detectors for intense luminosity investigations and applications." Sensors 18.7 (2018): 2289.
[2] Tudisco, S., et al. "Silicon Carbide devices for radiation detection: A review of the main performances." Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 1072 (2025): 170112.
[3] Tudisco, S., et al. "A new large area monolithic silicon telescope." Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 426.2-3 (1999): 436-445.

Topic

Solid state sensors

Title

Auteur: ALTANA, Carmen (INFN - LNS)

Co-auteurs: MUOIO, Annamaria (CNR-IMM); CIAMPI, Caterina (GANIL); LA VIA, Francesco (CNR-IMM); PASQUALI, Gabriele (INFN and Department of Physics, University of Florence); LANZALONE, Gaetano (INFN-LNS and KORE University); SAPIENZA, Giuseppe (INFN-LNS); TUDISCO, Salvatore (INFN-LNS); DE LUCA, Saverio (CNR-IMM)

Orateur: ALTANA, Carmen (INFN - LNS)

Classification de Session: Poster session - Cocktail