Contribution ID: **23** Type: **not specified**

Advancements in the characterization of SiC devices within the SAMOTHRACE ecosystem

Tuesday, 25 February 2025 09:30 (20 minutes)

N.S. Martorana1, G. D'Agata1,2, A. Barbon1,2, G. Cardella1, E. Geraci1,2,3, L. Acosta4,5, C. Altana6, A. Castoldi7, E. De Filippo 1, S. De Luca6, P. Figuera6, B. Gnoffo1,2, C. Guazzoni7, C. Maiolino6, E.V. Pagano6, S. Pirrone 1, G. Politi 1,2, L. Quattrocchi1,8, F. Risitano1,8, F. Rizzo2,3,6, P. Russotto6, G. Sapienza6, M. Trimarchi1,7, S. Tudisco6, C. Zagami 2,3,6

1 INFN-Sezione di Catania, Catania, Italy
2 Dipartimento di Fisica e Astronomia "Ettore Majorana", Università degli Studi di Catania, Catania, Italy
3 CSFNSM, Catania, Italy
4 Instituto de Fisica, Universidad Nacional Autònoma de México, Mexico City, Mexico
5 Instituto de Estructura de la Materia, CSIC, Spain
6INFN-LNS, Catania, Italy
7DEIB Politecnico Milano and INFN Sez. Milano, Milano, Italy
8 Dipartimento MIFT, Università di Messina, Messina, Italy

This contribution highlights recent results obtained in the characterization of new-generation Silicon Carbide (SiC) devices. Due to their peculiar features, SiC detectors are recognized as an excellent choice for charged particles detection, for both medical applications and nuclear physics studies [1-6]. Specifically, within the SAMOTHRACE ecosystem [7], a SiC detector array is under development for the detection of Radioactive Ion Beams (RIBs), which currently represent a new frontier for both medical and nuclear physics fields. This array, coupled with a fast electronics front-end [8-9], is designed to be compact, versatile, and capable of providing detailed information on RIBs. A key feature of this detection system is its high timing performance, which offers significant advantages in experimental studies involving RIBs. The reported results, obtained using radioactive α sources as well as accelerated proton and α beams, focus on evaluating the SiC detectors energy resolution and timing performance. In the latter case, a novel method based on crossing time and signal-sharing analysis has been employed to assess the time resolution of SiC detectors. A comparison of the timing resolution achieved using a micro-channel plate detector will also be discussed.

[1] Tudisco S. et al., Sensors, 18 (2018)
[2] Martorana N. S. et al., Frontiers in Physics, 10 (2022) and references therein
[3] Martorana N.S. et al., Il Nuovo Cimento 47 C (2024) 56
[4] M. De Napoli, Frontiers in Physics 10:898833, (2022)
[5] Boscolo D. et al., Frontiers in Oncology, 11 (2021)
[6] Durante M. and Parodi K., Frontiers in Physics, 8 (2020)
[7] www.samothrace.eu
[8] Acosta L. et al., EPJ Web of Conferences 288, 04001 (2023)
[9] A. Castoldi et al., IEEE Trans. Nucl. Sci., 70, 1431 (2023).

Primary author: MARTORANA, Nunzia Simona (Istituto Nazionale di Fisica Nucleare)

Presenter: MARTORANA, Nunzia Simona (Istituto Nazionale di Fisica Nucleare)

Session Classification: Day 2 - Session 1