# Characterization and simulation of Silicon Carbide devices in the SAMOTHRACE ecosystem*


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Silicon carbide (SiC) radiation detectors are gaining significant interest due to their exceptional properties, which have attracted attention from both scientific and industrial researchers. SiC is characterized by outstanding radiation hardness, high thermal conductivity, thermal stability, and a wide bandgap, making it an ideal material for a variety of applications in fields such as nuclear and medical physics [1,2]. In medical physics, the growing demand for compact, portable, and efficient instrumentation is driving the adoption of semiconductor-based solutions. SiC, along with silicon, is increasingly integrated into medical devices due to its ability to enable miniaturization, enhance portability, and support real-time data acquisition [3,4].

With the development of new accelerator facilities [5,6], the availability of RIBs is expanding, offering new opportunities for precise dose delivery and real-time imaging in cancer treatment. In this context, SiC detectors are particularly well-suited due to their excellent timing performance, radiation hardness, and compactness.

This work presents the characterization of two SiC-based detectors in the SAMOTHRACE ecosystem [7]: a 10 $\mu$m-thick detector designed to be used as dosimeter and micro-dosimeter, and a 100 $\mu$m-thick detector optimized for beam tagging. In addition to the experimental results we present dedicated simulations of the two prototypes. Furthermore, we will present a novel method based on crossing time and signal-sharing analyses to determine the time resolution of individual SiC pixels [8,9].


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