

HADES beam monitors and timing detectors based on Single-Crystal CVD diamonds

HADES at GSI is designed to carry out dielectron and hadron measurements of HI, proton and pion induced reactions. As this is a high intensity, fixed target experiment, it requires beam intensities up to 10^7 particles/s. An additional challenge in case of dielectron measurement is the conversion process (background process) in the target area which can be minimized by using small size, segmented targets, typically 2 mm in diameter. For particle identification via time of flight and for beam monitoring (position, focus and intensity measurement) very fast, radiation hard and thin beam detectors are essential.

For proton beams, with kinetic energies above 1.5 GeV, currently available Polycrystalline Diamond detectors deliver signals which are too small for fast timing purposes. Thus, to achieve high efficiency for MIP (Minimum-Ionizing Particles) detection (SC) Single-Crystal CVD diamond detectors have been used.

In this report an overview of the activities and results of the HADES diamond group will be given. It will contain a description of a set of SC diamond detectors for beam monitoring, details on different metallization schemes used and tested to achieve stable, long-term operation of the detector and the recent results in terms of time resolution and rate capability. Dedicated front-end electronics designed for this application will also be covered.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

http://www-hades.gsi.de/~shower/pietrasz/diamond_HADES_v1.pdf

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