

Novel applications and future perspectives of a fast diamond gamma-detector

For the first time, a diamond sensor was operated for the characterisation of a high average-intensity γ -ray beam.

Data was collected for γ -beam energies between 2 and 7 MeV, at the HI γ S facility of TUNL.

The nanosecond-fast resolution of diamond detectors is exploited to distinguish bunches of γ -rays 16.8 ns apart.

It allows a precise direct determination of the time-structure of the γ -beam.

The strong potential of such a detector for precise absolute flux, position and polarisation measurements are exposed.

It is thus shown that diamond detectors are a decisive and unique tool for the detailed characterisation of upcoming

γ -sources, such as ELI-NP and HI γ S-2, which will revolutionise the future of nuclear physics.

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