

## Hyperfine interactions measurements in bismuth tri-iodide (BiI<sub>3</sub>) by time differential perturbed angular correlation spectroscopy (TDPAC)

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### Abstract

Bismuth tri-iodide (BiI<sub>3</sub>) is a material of great interest in applications such as solar cells and semiconductor detectors. In the work reported here, bulk samples of BiI<sub>3</sub> were characterized by time differential perturbed angular correlation spectroscopy (TDPAC) at different temperatures using <sup>111m</sup>Cd (<sup>111</sup>Cd) and <sup>111</sup>In (<sup>111</sup>Cd) as radioactive probes, inserted by implantation at ISOLDE/CERN and by thermal diffusion at IPEN, respectively. TDPAC measurements were used to investigate the hyperfine interactions at Bi sites in the crystalline structure of BiI<sub>3</sub>. The hyperfine parameters obtained were analyzed to elucidate the electrical properties expected for the mentioned technological applications. The optimal temperatures for annealing after the implantation (300°C and 320°C) were determined, allowing to observe the perturbation pattern R(t). Measurements show that the incidence of UV light at 350–363nm wavelength has an effect on the electronic structure around the Cd probe nuclei located near the surface of samples.