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New diamond detector structure and related front-end electronics for TOF application

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The results obtained at BTF (Beam Test Facility) of Frascati with 500 MeV electrons working at single electron mode and with cosmic rays have shown a time resolution of the order of 100 ps with a polycrystalline diamond detector of 1.25 mm total thickness and a surface of 3x3 mmˆ2 operated at 350 V. To achieve this performance, a new structure of the diamond detector and a dedicated front-end electronics have been developed. The results obtained will be compared with standard mono and polycrystalline diamond detectors. This new structure of the detector together with the dedicated front-end electronics suggest the possibility to realize diamond detectors for MIPs with time resolution of the order of few tens ps.

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