

P4.1010 The direct detection of runaway electrons using the semiconductor strip detector

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See full abstract here

<http://ocs.ciemat.es/EPS2019ABS/pdf/P4.1010.pdf>

The runaway electrons have serious detrimental effects on the vacuum components of tokamaks. They emerge during plasma disruptions and the energy of accelerated electrons can reach the order of tens of MeV. Recent advances in semiconductor detectors allowed their widespread application in high-temperature plasma diagnostics. They have fast response and offer a good spatial and temporal resolution. For these reasons a silicon strip semiconductor detector (PH32) was installed on tokamak GOLEM ($R = 0.4$ m, $a = 0.085$ m, $B_{tor} < 0.5$ T, $I_{pl} < 8$ kA). The detector (fig. 1a) was placed in the vacuum chamber near the plasma edge, mounted on a radial manipulator, therefore it was possible to observe RE directly. Data from 32 strips of a detector was acquired digitally in hit-count mode. An analog output from one strip was connected to an oscilloscope. Measurements were compared with already existing diagnostics, especially with an output from HXR scintillators. The analog output from detector provides comparable results to scintillator measurements (fig. 1b), during vacuum discharge no signal was produced. In addition, data from multiple discharges shows great dependency on detector position in respect to the radial orientation of the detector to plasma and direction of plasma current.

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