

Progress in HXR diagnostics at GOLEM and COMPASS tokamaks

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Scintillation detectors are widely used for hard X-ray spectroscopy and allow us to investigate dynamics of runaway electrons in tokamaks. This diagnostic tool proved that can provide information about energy or a number of runaway electrons and in past was used for runaway studies at GOLEM and COMPASS tokamaks [1,2]. In recent years hard X-ray spectroscopy at GOLEM and COMPASS tokamaks have mainly relied on NaI(Tl) based detectors, which represent standard in spectroscopy. The set of detectors and also their type was significantly extended and improved. Besides NaI(Tl) scintillation detectors, YAP(Ce) and CeBr₃ were employed. Particularly, usage of CeBr₃ enhanced diagnostic capabilities, because its of short decay time (compare to NaI(Tl)) and good energy resolution. Also data acquisition system was accordingly improved and Tektornix MSO64 oscilloscope is dedicated to collect data from scintillation detector with appropriate sampling rate and sufficient bandwidth to allow pulse analysis. Up to five detectors can currently simultaneously monitor hard X-ray radiation at GOLEM and were implemented into GOLEM environment. Same scintillation detectors were also installed during runaway electron campaign at the COMPASS tokamak in order to provide estimation about runaway electron energy. The aim of this contribution is to report progress in diagnostic of HXR radiation induced by runaway electrons at GOLEM and COMPASS tokamaks. Acquired data from experimental campaigns from both machines will be discussed and put into context of runaway electron research on these two machines [3].

References

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