

Title: Development and application of methods for measurement of magnetic field on tokamaks

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Abstract: Thesis describes two parts of my work in frame of magnetic confined fusion research. First part describes irradiation testing of the Hall sensors based on InSb semiconductor. It evaluates radiation effects of fast and thermal neutrons on the Hall sensors sensitivity. Tests indicate low level of changes for fluence lower only by order of magnitude than expected in the whole lifetime of ITER tokamak. Second part describes measurement of turbulent plasma structures parameters in scrape-off layer of the COMPASS tokamak, particularly the parallel electric current flowing along them. Design of novel combined probe allowing measurement of not only electrostatic parameters but also the parallel electric current is presented. Evaluation of parallel electric current is discussed and compared with experiment. Statistical analysis of the plasma structures is presented. Empirical formulas of the parallel electric current in dependence on parameters of the plasma structures and discharge are provided.

Keywords: nuclear fusion, tokamak, Hall sensor, Scrape-off layer, turbulence