

Radiation Losses Study on the Tokamak T-10 Using AXUV-Detectors

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Results are presented from currently installed bolometric diagnostics on the T-10 tokamak. The diagnostics consists of pinhole camera equipped with an AXUV linear array of 16 photodiodes, characterized by a flat spectral sensitivity from ultraviolet to x-ray energies. The photodiodes have a high temporal response and are insensitive to low-energy neutral particles emitted by the plasma. The pinhole camera views the poloidal plasma cross-section and permits to measure the total radiated power. A pyroelectric bolometer is installed at the same cross-section and it is possible to compare the results obtained by different kinds of detectors. In the experiments with blowing of heavy impurities complete agreement between AXUV-detectors and pyroelectric bolometer results takes place. The AXUV linear array permits to measure the space distribution of radiated power. To obtain radial emissivity, data inversion has been performed using an algebraic inversion algorithm (assuming toroidal symmetry of the shells with equal emissivity). The performance of the system is illustrated with results for different confinement regimes. In cases of highly peaked radiated power profiles an impurity accumulation mechanism can be considered as an explanation. The study of short time scale processes during pellet –injection and impurity seeding is enabled by the high temporal resolution. Highly asymmetric chord signal distribution in non- steady-state conditions can also be followed.