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P2.051 Development of Thomson scattering system for VEST

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Thomson scattering (TS) system is developed to measure the electron temperature and density of Versatile Experiment Spherical Torus (VEST). Since it is the key diagnostics for measuring the local electron properties of the core plasma, each part of the system is carefully designed to provide a reliable measurement result. Besides, as additional heating devices such as neutral beam injection and electron cyclotron heating become available, the importance of the TS system has been emphasized to evaluate their effect. However, for VEST, measuring TS photons is especially challenging, because a low power of the laser and band pass filters of low efficiencies considerably decrease the number of scattering photons. In addition, the scattering signal and the stray light signal are detected in relatively short time interval due to the small chamber size. It means that decomposition of both signals is more difficult than conventional tokamaks. For successful measurement in such conditions, we have tried to minimize the noises such as stray light and high frequency interference from the pulse laser as well as the random background noise to obtain the enough signal-to-noise ratio. The time evolution of the electron temperature and density can be measured by shot-to-shot experiments with the extra efforts for synchronization and optimization of the polychromator.

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