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2.6 Development of the multi-pass Thomson scattering system with the laser amplification system

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Thomson scattering (TS) system is one of the useful diagnostics to measure electron temperature and density in fusion plasmas. The multi-pass Thomson scattering (MPTS) system is useful technique for increasing the TS signal intensities and improving the TS diagnostic time resolution. The MPTS system developed in GAMMA 10/PDX has a polarization-based configuration with an image relaying system. The MPTS system has been constructed for enhancing the Thomson scattered signals for the improvement of measurement accuracy and the MHz sampling time resolution. However, in the normal MPTS system, the MPTS signal intensities decrease with the pass number, because of the damping due to the constructed optical components. Then we have been developing the new MPTS system with the laser amplification system. The laser amplification system can improve the degraded laser power after six passed in the multi-pass system to the initial laser power. We successfully obtained the continued multi-pass signals after the laser amplification system in the gas scattering experiments for the first time.

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