

Abstract Submitted
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Development of a laser collective scattering system for measuring short-scale turbulence on HL-2A Tokamak¹ KE YAO, Southwestern Institute of Physics, YUHONG XU, Southwest Jiaotong University, YI LIU, ZHONGBING SHI, Southwestern Institute of Physics — A CO₂ laser collective scattering system has been successfully developed to measure short-scale density fluctuations at the HL-2A tokamak. At present, there are two detective channels with homodyne detection. It can measure the radial wavenumber k_r in a range of $10 \sim 40 \text{ cm}^{-1}$. Both the main beam and local oscillator beams pass through plasmas tangentially. Taking the advantages of the toroidal curvature of the magnetic field lines and the small turbulence wavevector being perpendicular to the field lines, local measurements of the scattering light are available. Besides the small-scale turbulent fluctuations, a lot of MHD activities can also be detected by this system. And the local oscillator beams passing through the plasma (far-forward scattering) is the reason why this high-wavenumber diagnostic system can detect the macro-instabilities. The methods of separating small-scale and large-scale fluctuation signals are introduced also. During the last experimental campaign, lots of phenomena associated with small-scale turbulence on HL-2A tokamak have been observed by this diagnostic system.

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