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12.38 First Experimental Results of a Newly-developed Gas Puff and Supersonic Molecular Beam Imaging Diagnostic of HL-2A Tokamak

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A new gas puff(GP) and supersonic molecular beam(SMB) imaging diagnostic system has been developed on HL-2A tokamak to study plasma turbulence and transport dynamics of supersonic molecular beam injection(SMBI) fueling at the edge and scrape-off layer(SOL) of HL-2A tokamak. A specially designed telescope and a high-speed camera are used to observe and record the emission from the neutral gas cloud, typically helium or deuterium. The brightness and contrast of the two-dimensional(2-D) radial vs poloidal sequential images reveal the structures of the turbulence or the interaction between the supersonic molecular beam and plasma. Neutral helium or deuterium gas is puffed into the plasma from a rectangular multi-capillary nozzle or the SMBI nozzle. The diagnostic system was put into service during the latest two campaigns under various discharge modes, including ohmic, L-mode and H-mode. Some experimental results, including 2-D profiles of radial velocity, poloidal velocity and skewness of the fluctuation intensity, and the penetration and deposition of the SMB, will be introduced during HTPD2018 in San Diego.

Primary author(s) : YUAN, Boda (University of Science and Technology of China)

Presenter(s) : YUAN, Boda (University of Science and Technology of China)

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