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Plasma Flow Measurement using Mach Probe and Laser-Induced Fluorescence in Weakly Magnetized Plasmas HYUN-JONG WOO, KYU-SUN CHUNG, EUN-KYUNG PARK, Dept. of Electrical Engineering, Hanyang University, MYOUNG-JAE LEE, Dept. of Physics, Hanyang University — A Mach probe (MP) is generally used for the measurement of plasma flow velocity in the edge of magnetic fusion devices, space propulsion systems, processing plasmas, sheath and pre-sheath regions. Although several un-magnetized MP theories are available, their validity has not been fully confirmed, and should be checked by comparative (or simultaneous) measurement with another diagnostic tool such as laser-induced fluorescence (LIF). The plasma flow velocity was measured via an MP and LIF method in Ar plasma generated by LaB₆ cathode of Diversified Plasma Simulator - Modification (DiPS-M). The MP and LIF measurements are performed in the ranges of magnetic field intensities, $100 < B < 1000$ (Gauss) and the various neutral pressures, $1 < P_n < 30$ (mTorr) with flow velocity of up to $0.5 M_c$, where M_c is the Mach number, using the magnetic laval nozzle. The results was explained in terms of magnetic field (or ratio of ion gyro-radius to probe size) and neutral pressure (or ion-neutral collisionality).

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