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Dust Effects on a Free Presheaths in Weakly Magnetized Plasmas

I.J. KANG, M.K. BAE, S.G. CHP, S.Y. KIM, S.H. HONG, H.G. CHOI, Y.S. OH, H.T. OH, I.S. PARK, Department of Electrical Engineering, Hanyang University, T. LHO, Plasma Technology Research Center, National Fusion Research Institute, K.S. CHUNG, Department of Electrical Engineering, Hanyang University — Dust effects on a diffusion coefficient and a connection length at a free presheath regions have been investigated as a part of experimental simulation of dust interaction with plasmas and plasma edge transport at Divertor Plasma Simulator – 2 (DiPS-2) with the following conditions: plasma density $1 \sim 10^{12} \text{ cm}^3$, electron temperature $1 \sim 10 \text{ eV}$ and magnetic field $\sim 1 \text{ kG}$, where the characteristics of DiPS-2 is the following: 12 V and 280 A for LaB₆ heating, 50 – 100 V and 20 – 40 A for plasma discharge. Pulsed laser beams by a 250 mJ Nd:YAG laser were injected to a tungsten target for production of dust particles. Free presheaths were artificially generated by inserting a tungsten perturbing object with diameter = 1.5 cm at the center of plasmas in DiPS-2. Radial plasma profiles were measured by using a fast scanning probe (FSP) system with triple probe (TP) and Mach probe (MP) and a laser induced fluorescence (LIF) system. Dust effects on a diffusion coefficient and a connection length in the presheath region were analysed by comparing the plasma parameter of dusty and pure plasmas.

I.J. Kang
Department of Electrical Engineering, Hanyang University

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