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Category Number and Subject: 562 (DIII-D Tokamak)

Theory Experiment

Migration of Micron Size Carbon Dust in the DIII-D Divertor,* C.P.C. Wong, N.H. Brooks, T.E. Evans, A.W. Hyatt, W.P. West, *GA*, D.L. Rudakov, G.~Antar, J.A. Boedo, E.M. Hollmann, S.I. Krasheninnikov, R.A. Moyer, A.Yu Pigarov, *UCSD*, M.E. Fenstermacher, M. Groth, C.J. Lasnier, *LLNL*, R. Maingi, *ORNL*, A.G. McLean, *U. Toronto*, W.M. Solomon, *PPPL* – We studied migration of pre-characterized carbon dust in a tokamak environment by introducing about 30~mg of micron-size dust flakes (5-10 μm in diameter) in the lower divertor of DIII-D using the DiMES sample holder. In two separate experiments dust was exposed to strikepoint sweeps of high power lower-single-null discharges in an ELMing H-mode regime. When the outer strike point passed over the dust holder, 1-2% of the total dust carbon content (equivalent to a few million of dust particles) penetrated the plasma core, raising the core carbon density by a factor of 2-3. Individual dust particles were observed moving at velocities of 10–100 m/s, predominantly in the toroidal direction consistent with the ion drag force. The observed behavior of the dust is in qualitative agreement with modeling by the DustT code.

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