

Measurement of number density and size distribution of dust in DIII-D during normal plasma operation

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Abstract. Dust particles with submicron radii have been observed in the scrape-off layer (SOL) and divertor region of DIII-D during normal plasma operation. The particles are observed via their relatively large cross section for Rayleigh scattering of the Nd:YAG laser used for Thomson scattering measurements of electron density and temperature. In the outer region of the SOL particles are rare, with an average density of about 6×10^3 particles/m³. The particle density falls sharply going toward the last closed flux surface, being ~ 0 at and inside the separatrix. Modeling of the observed pulse height distribution indicates an average particle radius of ~ 80 nm. These measurements indicate that dust created by normal plasma operation is not a likely source of core carbon contamination on DIII-D, nor is it be a serious contributor to redeposition of carbon films.