Abstract Submitted
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Scaling Laws for Pellet Ablation in Tokamaks[1] TIANSHI LU, PATRICK RINKER, Wichita State University — We investigated by numerical simulations the effect of various physical parameters on the pellet ablation rate and analyzed the scaling laws. Our study on the non-rotational ablation cloud indicated that the ablation rate is a function of the toroidal magnetic field and the warm-up time. Our recent numerical simulation of the rotational ablation cloud confirmed the effect of the magnetic field, however, it showed that the ablation rate of a rotational cloud is insensitive to the warm-up time. The ablation rate has weak dependence on the effective longitudinal shielding distance. Although pellet penetration measurements from JET, ASDEX and Tore Supra seemed to be in good agreement with the NGS scaling laws, deviation from the NGS scaling laws has been reported by the ASDEX upgrade team [1]. We will present our systematic study of the effects of the physical parameters and their scaling laws. The validation of our MHD code against experimental data from DIII-D tokamak pellet launches will also be presented. The pellet lifetime and density profiles reproduced by simulations will be compared to the experimental measurements [2]. [1] K. Gal, et al, Nucl. Fusion, 48, 085005 (2008). [2] P.B. Parks and L.R. Baylor, Phys. Rev. Lett. 94, 125002 (2005).

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