Abstract Submitted
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Intrinsic Rotation of Pellet Ablation Clouds[1] P.B. PARKS, General Atomics, T. LU, R. SAMULYAK, Brookhaven National Laboratory — The finite resistivity code Frontier-MHD [1] is used to simulate the ablation rate of refueling pellets, including the effect of electrostatically induced $E \times B$ rotation of the ablation cloud about its symmetry axis parallel to the magnetic field [2]. The radial electric field E is set up as a consequence of charge and current neutralization at the end sheaths of the ablation column. The key finding is that the centrifugal force of cloud rotation pushes the cloud density radially outwards, creating a more "transparent" ablation channel. With reduced shielding, the *steady-state* ablation rate of a deuterium pellet significantly increases by 35% to 100%, depending on the B-field strength. This effect brings the ablation rate into better accord with a known theoretical scaling law, which agrees with most current experiments. However, the *transient* ablation rate is shown under the rather extreme situation of a fast pellet traveling across the steep-gradient pedestal region of ITER, to be a factor of 2 lower than predictions from the quasi-steady models.

[1] R. Samulyak et al., Nucl. Fusion **47**, 103 (2007).
[2] P.B. Parks et al., Phys Plasmas **16**, 060705 (2009)

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