

Abstract Submitted
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Generalization of the Heuristic Drift Model of the SOL for Finite Collisionality¹ ROBERT GOLDSTON, Princeton Plasma Physics Laboratory — The Heuristic Drift (HD) model for the scrape off layer (SOL) power flux width ² was explicitly formulated for low-gas-puff H-Mode conditions. Experimental results in these conditions have shown good agreement with the model. In 2015, however, ASDEX-Upgrade (AUG) data showed that the scrape-off width broadens as the collisionality increases ³, which is inconsistent with the HD model as formulated. We hypothesize that this broadening is due to enhanced residence time of heat in the scrape-off-layer (SOL) at higher collisionality, due to higher classical parallel thermal resistance. This allows more time for cross-field drifts to broaden the SOL. We find reasonable agreement with more extensive recent AUG data ⁴ for SOL broadening at high collisionality. This broadening may play a synergistic role with turbulence in degrading global energy confinement.

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²R.J. Goldston, Nucl. Fusion 52, 013009 (2012)

³H.J. Sun et al., Plasma Phys. Control. Fusion 57, 125011 (2015)

⁴T. Eich et al, EPS-DPP Conference, 2019

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