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In search of Greenwald scaling in edge shear layer collapse at high density RAMESWAR SINGH, NARENDRA MODI, PATRICK DIAMOND, University of California, San Diego — The density limit phenomenology follows from the collapse of edge shear layers, leading to increased turbulence, transport and edge cooling, et seq. The challenge is to understand how the robust Greenwald scaling $\underline{n}_g \sim I_p$ is related to the collapse physics. Neoclassical zonal flow screening is a natural mechanism for the emergence of the $I_p$scaling. The current (I_p)scaling due to neoclassical screening survives in the plateau regime, characteristics of edge plasmas. A new model of the coupled drift wave-zonal flow system is presented. Neoclassical response is included in the zonal flow evolution while the drift waves follow the Hasegawa-Wakatani model. This model leads to two synergistic results. A spectral equation for zonal flow intensity shows that the zonal flow modulational growth rate scale as $I_p$whereas the zonal noise exhibits the stronger scaling of I_p. This assures stronger flow seeding with increasing current. Quasilinear vorticity flux reveal that the mean vorticity gradient increases with plasma current as I_p. Both these results indicate that large $I_p$favors stronger zonal flow production and stronger feedback on drift waves and transport. A reduced D transport modelling is in progress to study $\underline{n}$scaling with $I_p$and other dimensionless parameters.

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