Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Dynamics of Shear Layer Collapse in Modified Hasegawa–Wakatani Channel Flows[1] MIKHAIL MALKOV, University of California, San Diego, PATRICK DIAMOND, University of California San Diego — Density limit phenomenology has been associated with the collapse of edge shear layers at high density. Theoretical work has suggested that the onset of such collapse occurs when adiabaticity $\alpha = k_{\|}^2 V_{th}^2/\omega\nu$ drops below $\alpha_{crit} \approx 1$. Here, we explored shear flow dynamics in a spatially varying $\alpha(x)$ profile. $\alpha < \alpha_{crit}$ on the outer boundary, and $\alpha > \alpha_{crit}$ on the inner one. The gradient in α triggers the formation of a barrier shear layer, which separates the regions of isotropic turbulence and zonal flows. The barrier is pinned to the location of α_{crit} and does not propagate. Work on the effect of a spatially profiled neutral drag (reflecting a neutral profile) is ongoing. More generally, we report on some interesting differences between zonal flow phenomena in the conventional doubly periodic box and in channel flows. Specifically: i) Zonal flows are more coherent in the channel flow. ii) A transition curve of $R = \frac{ZFEnergy}{TotalKineticEnergy}$ is largely monotonic in for the box. More complex behavior is shown in the case of the channel flow. iii) Time histories are different for the box and channel cases. Work on all the issues discussed above is ongoing.

[1]Supported by the U.S. Department of Energy

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Date submitted: 25 Jun 2020 Electronic form version 1.4