Abstract Submitted
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**Fundamental Scalings of Zonal Flows in a Basic Plasma Physics Experiment**[1] VLADIMIR SOKOLOV, XIAO WEI, AMIYA K. SEN, Columbia University — A basic physics experimental study of zonal flows (ZF) associated with ITG (ion temperature gradient) drift modes has been performed in the Columbia Linear Machine (CLM) and ZF has been definitively identified [1]. However, in contrast to most tokamak experiments, the stabilizing effect of ZF shear to ITG appears to be small in CLM. We now report on the study of important scaling behavior of ZF. First and most importantly, we report on the collisional damping scaling of ZF, which is considered to be its saturation mechanism [2]. By varying the sum of ion-ion and ion-neutral collision frequency over nearly half an order of magnitude, we find no change in the amplitude of ZF. Secondly, we study the scaling of ZF amplitude with ITG amplitude via increasing ITG drive though $\eta_i$, as well as feedback (stabilizing / destabilizing). We have observed markedly different scaling near and far above marginal stability.

[1] V. Sokolov, X. Wei, A.K. Sen and K. Avinash, *Plasma Phys.Controlled Fusion 48, S111 (2006).*

[2] *P.H. Diamond, S.-I. Itoh, K.Itoh and T.S. Hahm, Plasma Phys.Controlled Fusion 47, R35 (2005).*

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