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Interaction between velocity shear and turbulent fluctuations in Texas Helimak[1] SH NOGAMI, ME KOEPKE, VI DEMIDOV, West Virginia Univ, KW GENTLE , Univ of Texas, Austin — Efforts to identify mechanism by which turbulence is suppressed in Helimak when radial electric field is externally applied are described. Candidate mechanisms include linear and nonlinear coupling between fluctuations and flows as in a Lotka-Volterra predator-prey model, mode coupling with a stable or damped mode (fluctuation-amplitude reduction [Terry et al, Phys. Plasmas 2006]), and changes in phase relationship between density and potential fluctuations as in the velocity shear decorrelation of turbulence models (fluctuation-amplitude reduction [Biglari et al, Phys. Fluids B, 1990]). We compare experimental results obtained from magnetically insulated baffled probe cluster [Koepke et al, Contrib. Plasma Phys., 2006] with existing models of candidate mechanisms. Already-completed spectral analysis of suppressed and turbulent states of Helimak plasma leads us to anticipate that the state of suppressed turbulence is the result of an unstable mode being stabilized or being coupled to a stable/damped mode via its interaction with enhanced velocity shear.

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