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Category Number and Subject: : 5.6.2. DIII-D Tokamak

Theory Experiment

The geodesic acoustic mode and zonal flows in DIII-D,* J.C. Hillesheim, W.A. Peebles, T.A. Carter, T.L. Rhodes, L. Schmitz, *UCLA*; and the DIII-D Team – Turbulence model validation experiments have generally shown more disagreement towards the edge, $r/a > 0.75$, than in the core; this motivates more detailed comparisons of measured turbulence and zonal flow characteristics to models and simulations. Measurements have been made in DIII-D with two multichannel Doppler backscattering systems at toroidal locations separated by 180 deg. Observations show that the GAM in L-mode DIII-D plasmas can occur as a radially coherent eigenmode, consistent with theory when finite k_{\parallel} effects are included. The intermittency of the GAM has been quantified; its autocorrelation time is fairly short, ranging from ~ 3 to ~ 15 GAM periods in cases examined. Conditionally averaged bispectral analysis shows the strength of the nonlinear interaction of the GAM with broadband turbulence varies with the magnitude of the GAM. In otherwise similar discharges, the GAM's amplitude is significantly smaller with counter-injected neutral beams than with co-injection. Initial comparisons to simulations will be presented.

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