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Category Number and Subject:

Theory      Experiment

**Variation of Turbulence and Transport with the  $T_e/T_i$  Ratio in H-mode Plasmas,\*** G.R. McKee, Z. Yan, R.J. Fonck, I.U. Uzun-Kaymak, *U. Wisconsin*; T.L. Rhodes, L. Schmitz, UCLA; C. Holland, UCSD; A.E. White, MIT — Confinement and transport vary strongly with  $T_e/T_i$ . Recent experiments on DIII-D have sought to examine the physical mechanisms behind this dependence by systematically varying  $T_e/T_i$  in L and H-mode plasmas, while  $T_i$ , rotation, density and gradient scale lengths are held roughly constant.  $T_e/T_i$  is increased by 25% (achieving  $T_e/T_i \leq 1$ ) in non-sawtoothed, long-pulse hybrid H-mode plasmas using 3.3 MW of ECH power, reducing  $\tau_E$  by 30%. The magnitude of low-k density fluctuations, measured with BES, is found to correspondingly increase by 30-50% over the radial range  $0.35 < r/a < 0.8$ . This turbulence behavior contrasts with that observed in L-mode experiments, in which confinement is reduced at higher  $T_e/T_i$ , but little change is observed in the magnitude of low-k density turbulence.  $S(k_r, k_\theta)$  spectra and related turbulence properties for L- and H-mode plasmas will be compared. Calculations of growth rates and predicted turbulence levels will be performed.

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