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Comparison of linear gyrokinetic and two-fluid stability analyses of DIII-D L-mode plasmas C. HOLLAND, E.M. BASS, Center for Energy Research, University of California, San Diego — We present results from a linear stability study of the edge and near-edge regions of well-studied DIII-D tokamak L-mode discharges, using both the gyrokinetic-Maxwell equations (as implemented in the GYRO code) and a range of two-fluid models implemented in the BOUT++ code. The goal is to identify instabilities that may help explain the well-known systematic under-prediction of near-edge DIII-D transport and fluctuation levels by some gyrokinetic codes, in particular those driven by edge physics not included within the gyrokinetic models. We first compare local and global gyrokinetic stability results spanning the region of $0.7 < \psi_N < 0.95$ to corresponding predictions from Braginskii-like models implemented in BOUT++, focusing on the influence of magnetic shaping and collisionality scalings for a range of low- to moderate-n modes, consistent with the observed discrepancies in fluctuation spectra. The closed-field line results are then compared against equivalent results that extend across the separatrix to the open field line region $0.7 < \psi_N < 1.05$, in order to assess whether inclusion of this region leads to any significant changes in linear stability. Progress on extending the linear analysis to inclusion of rotational and gyrofluid effects will also be reported.

C. Holland
Center for Energy Research, University of California, San Diego

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