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BOUT++ simulations of edge turbulence in Alcator C-Mod's EDA H-mode[1] E.M. DAVIS, M. PORKOLAB, J.W. HUGHES, B. LABOMBARD, MIT PSFC, P.B. SNYDER, General Atomics, X.Q. XU, LLNL, MIT PSFC TEAM, GENERAL ATOMICS TEAM, LLNL TEAM — Energy confinement in tokamaks is believed to be strongly controlled by plasma transport in the pedestal. The pedestal of Alcator C-Mod's Enhanced D_α (EDA) H-mode ($\nu^* > 1$) is regulated by a quasi-coherent mode (QCM), an edge fluctuation believed to reduce particle confinement and allow steady-state H-mode operation. `ELITE` calculations indicate that EDA H-modes sit well below the ideal peeling-ballooning instability threshold, in contrast with ELMy H-modes. Here, we use a 3-field reduced MHD model in `BOUT++` to study the effects of nonideal and nonlinear physics on EDA H-modes. In particular, incorporation of realistic pedestal resistivity is found to drive resistive ballooning modes (RBMs) and increase linear growth rates above the corresponding ideal rates. These RBMs may ultimately be responsible for constraining the EDA pedestal gradient. However, recent high-fidelity mirror Langmuir probe measurements indicate that the QCM is an electron drift-Alfvén wave - not a RBM. Inclusion of the parallel pressure gradient term in the 3-field reduced MHD Ohm's law and various higher field fluid models are implemented in an effort to capture this drift wave-like response.

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