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Simulations of disruption mitigation by high-pressure gas jet on Alcator C-Mod[1] V.A. IZZO, R.S. GRANETZ, MIT, D.G. WHYTE, M. BAKHTIARI, Univ. of Wisconsin, Madison — A high pressure gas-jet system has recently been tested as a means of disruption mitigation on Alcator C-Mod. Magnetohydrodynamic simulations are performed with NIMROD to investigate the mechanisms of thermal quench onset given various assumptions about impurity penetration depth and radiative cooling rate. Several simulations in which impurity penetration is varied between 1.5 and 3cm from the separatrix demonstrate the importance of proximity to the q = 2 surface for producing a rapid thermal quench. While the 2/1 mode is destabilized in all cases as the current profile contracts, radiative cooling at q = 2 greatly increases the growth rate of the mode over those cases where the impurities do not extend to q = 2. In the latter cases, the thermal quench begins once the width of the 2/1 island grows to overlap with the radiating edge, at which point stochastization of the flux surfaces begins. In another simulation, results from the radiative cooling code KPRAD are used as input for NIMROD, to produce more realistic radiation rates with the goal of performing a detailed comparison with experiment. Plans for running the two codes interactively are in development.

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