Abstract Submitted for the DPP17 Meeting of The American Physical Society

Optimization of DIII-D discharges to avoid AE destabilization¹ JACOBO VARELA, DONALD SPONG, ORNL, LUIS GARCIA, Universidad Carlos III of Madrid, JUAN HUANG, Institute of Plasma Physics, Chinese Academy of Science, Hefei, China, MASANORI MURAKAMI, ORNL — The aim of the study is to analyze the stability of Alfven Eigenmodes (AE) perturbed by energetic particles (EP) during DIII-D operation. We identify the optimal NBI operational regimes that avoid or minimize the negative effects of AE on the device performance. We use the reduced MHD equations to describe the linear evolution of the poloidal flux and the toroidal component of the vorticity in a full 3D system, coupled with equations of density and parallel velocity moments for the energetic particles, including the effect of the acoustic modes. We add the Landau damping and resonant destabilization effects using a closure relation. We perform parametric studies of the MHD and AE stability, taking into account the experimental profiles of the thermal plasma and EP, also using a range of values of the energetic particles β , density and velocity as well the effect of the toroidal couplings. We reproduce the AE activity observed in high poloidal β discharge at the pedestal [J. Huang, 58th APS DP/2016] and reverse shear discharges [W. W. Heidbrink, Nucl. Fusion, 53, 093006, (2013)].

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