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Effect of Externally Applied Perturbation Fields on Alfvénic MHD Activity in the NSTX Tokamak[1] ALESSANDRO BORTOLON, University of Tennessee, Knoxville — Observations from NSTX demonstrate that externally applied magnetic perturbations (MP) can alter the dynamic of beam driven Alfvén modes. Bursting Global Alfvén Eigenmodes (GAE, n=7-9, 400-700 kHz) respond to pulses of static n=3 fields (δB/B $\sim$ 0.01 at the plasma edge) reducing mode amplitude, bursting period and frequency sweep by a factor of 2-3 [Bortolon et al., Phys. Rev. Letters, Vol. 110 (2013) 265008]. Similar MP attenuate the amplitude of continuous Toroidal Alfvén Eigenmodes (TAE, n=2-3, 50-90 kHz). Calculations of the perturbed beam-ion distribution function, considering MP from ideal or resistive plasma response, confirm an enhanced fast-ion transport consistent with a reduced drive for the GAE. At the same time, MP can also affect the Alfvén stability by altering the structure of Alfvén continua through modification of the kinetic profiles or introducing toroidal coupling as result of the broken axisymmetry. Computations of the n=2 Alfvén continuum for NSTX equilibria with n=3 MP show strong modification of the TAE continuum near the plasma edge, where coupling between n=2 and n=5 continuum modes reduces the gap, providing an additional damping for TAE modes extending in this region.

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