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Comparison of Compressional Alfvén Eigenmodes in NSTX-U with Simulation Using the CAE3B Eigenmode Solver[1] N GEISER, Fordham U, N A CROCKER, UCLA, H SMITH, MPIPP Greifswald, E D FREDRICKSON , PPPL — In fusion research devices like the NSTX-U, compressional Alfvén eigenmodes (CAEs) occur at a discrete set of frequencies, or eigenmodes, and can be classified by three mode numbers. The code CAE3B [H M Smith, PPCF 075001 (2009)] simulates a Hall-MHD plasma with realistic geometry, allowing predictions of CAE frequency and structure for experimental plasmas. We compare CAE3B results with experimentally observed modes in NSTX plasmas in order to validate the physics of CAE3B. To make comparisons, it is necessary to develop techniques to determine which simulated modes should be compared to the experimental modes. Two techniques will be assessed: (1) mapping based on patterns of frequency clustering and (2) mapping based on similarity of long-term frequency evolution as plasma parameters change. Preliminary comparisons for an NSTX discharge at a single time show that high-n experimental modes (e.g. n=6) have frequencies significantly lower than the lowest predicted eigenmodes, suggesting that these experimental modes are not CAEs, but global Alfvén eigenmodes. Low-n experimental modes (e.g. n=3), however, have frequencies higher than the lowest predicted eigenmodes, suggesting that the modes are CAEs with higher poloidal or radial quantum numbers than the lowest eigenmode.

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