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Fast Particle Resonant Modes on MST J.J. KOLINER, C.B. FOREST, J.S. SARFF, J.K. ANDERSON, UW-Madison, L. LIN, W.X. DING, D.L. BROWER, UCLA, D.A. SPONG, ORNL — The interaction between fast particles and Alfvén eigenmodes (AE's) is an important process critical to magnetically confined fusion plasmas. An effort is in progress to understand AE's through theory and experiment on MST, a reversed-field pinch. Coupling of energetic particle dynamics to one or more continuum modes can introduce undamped AE's. This coupling can drive modes unstable, a condition pertinent to NBI on MST and fusion alpha particles in future RFP devices. Computational studies for MST have predicted toroidal AE's with frequencies in the 200-300 kHz range and global structure. Alfvén-wave-frequency modes have been observed with up to 1 MW of NBI. Toroidal and poloidal arrays of magnetic loops are utilized to find edge amplitudes, frequencies and mode numbers. Frequencies are in the 60-150 kHz range with n=4 and n=5, m=1. The strongest coherent activity scales inversely with density, as expected for AE's, but does not scale with magnetic field strength. Additional experiments to investigate resonance conditions and beam energy scaling have been performed. An FIR interferometer-polarimeter has been used to find internal structure of the detected modes through correlation analysis. Supported by USDoE and NSF.

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