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Observation of Electron Bernstein Wave Heating in the RFP ANDREW SELTZMAN, JAY ANDERSON, JOHN GOETZ, CARY FOREST, Univ of Wisconsin, Madison — The first observation of RF heating in a reversed field pinch (RFP) using the electron Bernstein wave (EBW) has been demonstrated on MST. Efficient mode conversion of an outboard-launched X mode wave at 5.5 GHz leads to Doppler-shifted resonant absorption ($\omega_{rf} = n\omega_{ce} - k_{||}v_{||}$) for a broad range (n=1-7) of harmonics. The dynamics of EBW-heated electrons are measured using a spatial distribution of solid targets with diametrically opposed x-ray detectors. EBW heating produces a clear supra-thermal electron tail in MST. Radial deposition of the EBW is controlled with |B|and is measured using the HXR flux emitted from an insertable probe. In the thick-shelled MST RFP, the radial accessibility of EBW is limited to r/a >0.8 (˜10cm) by magnetic field error induced by the porthole necessary for the antenna. Experimental measurements show EBW propagation inward through a stochastic magnetic field. EBW-heated test electrons are used as a direct probe of edge (r/a >0.9) radial transport, showing a modest transition from 'standard' to reduced-tearing RFP operation. Electron loss is too fast for collisional effects and implies a large non-collisional radial diffusivity. EBW heating has been demonstrated in reduced magnetic stochasticity plasmas with β =15-20%. Work supported by USDOE.

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