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Time-resolved measurements of the energetic ion distribution in MST S. EILERMAN, A.F. ALMAGRI, J.K. ANDERSON, D.J. DEN HARTOG, S.T.A. KUMAR, D. LIU, R.M. MAGEE, M.D. NORNBERG, J. WAKSMAN, University of Wisconsin-Madison, V.V. BELYKH, S.V. POLOSATKIN, Budker Institute of Nuclear Physics, J. TITUS, Florida A&M University, G. FIKSEL, University of Rochester — Magnetic reconnection in MST generates a non-Maxwellian and anisotropic population of energetic ions. Neutral particle analysis shows a fast deuterium ion tail out to the diagnostic limit of 5 keV, and the measured neutron flux indicates that ions with higher energies must exist. A recently installed Advanced Neutral Particle Analyzer (ANPA) is capable of simultaneously measuring hydrogen and deuterium ions with energies up to 30 keV. Hydrogen beam ions are observed up to the nominal beam injection energies, and deuterium ion energies up to 25 keV are observed after magnetic reconnection events. ANPA signal levels are dependent on the background neutral density n_0, calculated from D_α emission and NENE Monte Carlo computations. Neutron flux measurements, which are less sensitive to n_0, are used in conjunction with the ANPA signals to constrain the time behavior of the fast ion distribution. The current ANPA viewport primarily samples ions with high $v_\perp/v$; a tangential viewport will be installed to sample ions with high $v_\parallel/v$, and Fokker-Planck modeling will be used to reconstruct the energetic ion velocity space. Work supported by USDOE.

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