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Energy and Pitch Distribution of Spontaneously-generated High-energy Bulk Ions in the RFP[1] JUNGHA KIM, JAY ANDERSON, JOSHUA REUSCH, SCOTT EILERMAN, WILLIAM CAPECCHI, University of Wisconsin-Madison — Magnetic reconnection events in the reversed field pinch (RFP) are known to heat bulk and impurity ions. Runaway due to a parallel electric field has recently been confirmed as an important acceleration mechanism for high energy test ions supplied by a neutral beam. This effect does not, however, explain the change in distribution of nearly Maxwellian bulk ions at a reconnection event. By operating MST near maximum current and low electron density, significant fusion neutron flux can be generated without neutral beam injection. The bulk ion distribution created in these plasmas is well-confined, non-Maxwellian, and can be measured by the Advanced Neutral Particle Analyzer (ANPA) placed at a radial or tangential porthole. Data show a high energy tail up to 25keV with a relatively higher signal in the low energy channels (8-15keV) at the radial port following a reconnection event. Analysis of the energy dependence of trapped orbits sampled by the ANPA at the radial view implies an abundance of lower energy particles in regions of higher neutral density. This mandates a careful deconvolution of the measured ANPA signal to compute the fast ion distribution.

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