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Fast Ion Generation and Confinement during Reconnection Events in the MST Reversed Field Pinch[1] RICHARD MAGEE, BRETT CHAPMAN, GENNADY FIKSEL, DARREN CRAIG, DAVID ENNIS, SANJAY GANGADHARA, University of Wisconsin - Madison, MADISON SYMMETRIC TORUS TEAM — Measurements of neutron flux from deuterium plasmas in the MST reversed field pinch used in conjunction with ion temperature measurements indicate the presence of a fast ion population generated at magnetic reconnection events. During a typical event, T_i on-axis approximately doubles, from $\sim$ 0.5 keV to $\sim$ 1 keV, in less than 200 μs. These events often produce neutron fluxes up to ten times higher than from thermal fusion alone. This flux is consistent with, for example, a small (1%), non-thermal population at $\sim$ 15 keV. After an event, the neutron flux decays with a time constant of 1 - 3 ms. However, if an event is followed by a period of reduced magnetic fluctuations (achieved either actively, by inductively driving a parallel current in the edge, or spontaneously), the neutron flux decays at a much slower rate, $\sim$ 20 ms, which indicates improved fast ion confinement.

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