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Ion Doppler Tomography to Probe Ion Heating in the Presence of a Guide Field on the Magnetic Reconnection Experiment (MRX) AARON GOODMAN, HANTAO JI, Princeton University, JONGSOO YOO, JONATHAN JARA-ALMONTE, Princeton Plasma Physics Laboratory — Magnetic reconnection is a fundamental plasma process in which magnetic energy is converted to particle energy during a global change in magnetic topology. Most reconnection events in space and fusion plasmas occur in the presence of a finite magnetic field, perpendicular to the reconnection layer, known as a guide field. Important questions in magnetic reconnection studies include how dissipated magnetic energy is distributed in the plasma and the mechanisms by which this energy is converted from field energy to particle energy. Computational studies and space data have begun to address the question of ion heating and energization in guide field configurations, however to date, only limited studies have been possible in laboratory plasmas. This is, in large part, due to diagnostic limitations. A new, low-temperature, tomographic ion doppler diagnostic, designed for the Facility for Laboratory Reconnection Experiments (FLARE), and in use on the Magnetic Reconnection Experiment (MRX), is presented here. This diagnostic is optimized for FLARE but designed to function on both experiments and is used to obtain toroidal velocity and temperature from measurements of plasma emission. Initial data from multiple regimes of guide field reconnection, for both ions and neutrals are included. Details of the tomographic inversion are also presented.

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