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Experimental Demonstration of Magnetic Reconnection in a Laboratory Scale with Guide Field[1] HYUNSUE KIM, JAN EGEDAL, JOE OLSEN, DOUGLASS ENDRIZZI, JOHN WALLACE, Univ of Wisconsin, Madison, TREX TEAM — Through a process called magnetic reconnection, the opposing solar wind and Earth magnetic fields annihilate and allow energetic solar particles to enter the magnetosphere. This energetic plasma can cause major disturbances to satellite communication networks and navigation systems, as well as electrical power grids. To better understand this process and prevent significant economic losses, NASA has launched the MMS Mission in 2015, a cluster of spacecraft which directly probes the reconnection sites in the magnetosphere. Though *in situ* measurements of reconnection in space are essential to our understanding of the process, the mission comes at a cost of over $1 billion. Thus, smaller laboratory experiments become essential to compliment the data acquired by MMS at relatively low cost. The Terrestrial Reconnection Experiment (TREX) currently aims to probe a similar configuration to dayside reconnection by adding a toroidal guide magnetic field, where under the right conditions, high frequency turbulent fluctuations are expected. Using a set of fast Langmuir probes to diagnose the fluctuations, the global structure of the plasma turbulence can be reconstructed. In this poster, an overview of the upgraded experiment and design progress of the fast Lprobe will be provided.

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