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Reconnection- driven MHD turbulence on the SSX plasma wind tunnel[1] MICHAEL BROWN, DAVID SCHAFFNER, ADRIAN WAN, JEFFREY OWUSU-BOATENG, Swarthmore College — High velocity merging experiments in the SSX plasma wind tunnel configuration generate high Reynolds number ($R_M \sim 1000$), high beta ($\beta \sim 0.5$), MHD turbulence. The turbulent plasma is fully ionized and fully magnetized ($\rho_i = 2\ mm \ll R = 8\ cm$). Typical merged plasma parameters are $T_i = 50\ eV, T_e = 10\ eV, n_e = 10^{21}\ m^{-3}, B = 0.5\ T$. Magnetic structure and fluctuations are measured with a 16 channel high-resolution probe array (4 mm spatial resolution, 30 MHz bandwidth). The turbulent MHD plasma is generated by multiple reconnection events and persists for many Alfvén times. The goal of this research is to study the universality of statistical measures of MHD turbulence. Reconnection-generated MHD turbulence in SSX shows a power-law spectrum and correlation function similar to that observed in the solar wind. Future plans include launching the turbulent plasma in a gas-filled expansion volume and imaging the resulting turbulence with a high-speed Xybion camera.

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