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Enhanced Thomson Scattering from Ion Acoustic Waves in a Magnetic Reconnection Current Sheet[1] L.G. SUTTLE, S.V. LEBEDEV, J.W.D. HALLIDAY, J.D. HARE, D.R. RUSSELL, E.R. TUBMAN, V. VALENZUELA-VILLASECA, Imperial College London, C. BRUULSEMA, W. ROZMUS, University of Alberta, N.F. LOUREIRO, Massachusetts Institute of Technology, M. KOEPKE, West Virginia University — We present Thomson scattering (TS) measurements probing the ion acoustic waves (IAWs) inside a magnetic reconnection current sheet, produced by super-Alfvenic magnetized plasma flows from ablating wire arrays [Suttle PRL 2016]. We measure the TS spectra of IAWs at spatially-resolved positions across the current sheet and upstream flows. Multiple simultaneous observation directions allow us to independently probe waves along different scattering vectors. In the direction parallel to the reconnection electric field we detect large current drift velocities, exceeding the local sound speed in the current sheet. We also observe a strong enhancement to the TS intensity in the sheet from IAWs propagating parallel to the current, compared to the predicted Spectral Density function S(ω,K). However, the enhancement is observed across both forward and backward propagating waves, contrary to the expectation for current-driven ion acoustic turbulence (IAT). We assess the stability of the layer to IAT and discuss other potential sources for the IAW enhancement.

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