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Experimental Investigation of Solitary structures using high frequency microprobes[1] WALTER GEKELMAN, PAT PRIBYL, ERIC LAWRENCE, University of California, Los Angeles, PAUL KINTNER, Dept. Electrical Engineering, Cornell University — High frequency ($f \simeq f_{pe}$)phenomena are routinely observed by spacecraft and have been studied in laboratory plasmas. One example is electron solitary structures,which are believed to be vorticies in electron velocity space. These structures are estimated to move at approximately half the electron thermal velocity and are several Debye lengths in diameter. This poses a challenge in a dense magnetoplasma where the Debye length is tens of microns, and the electron thermal speed is of order 10^8 cm/s. The probes under development are described by Pribyl et al., " Microprobe Development at the Basic Plasma Science Facility," in poster session 5.7.0. The exisitng probe bandwidth is 100 MHz-2GHz. This limited the density for these experiments to 5X10^{10} cm^{-3}. The probe was placed in a 3 mm diameter field aligned electron beam. Negative going spiky structures were observed in the beam. They are observed to move at half v_{the} and conditional averaging yields a temporal half width of 10 ns. Skewness, kurtosis and other properties of these structures will also be presented. Results with a new probe with smaller tips (2.5 microns) spaced 20 microns apart will be presented as well.

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