



STEREO Waves Observations and Theoretical Interpretation of Localized and Extended Langmuir Wavepackets

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The Time Domain Sampler (TDS) of the STEREO-A Waves instrument observed strongly localized Langmuir wavepackets, extended chains of spiky but connected Langmuir wavepackets, and intermediate cases within Earth's distant foreshock for several months after launch. Progress is reported on the characterization and theoretical interpretation of the waves. First, analyses of the TDS power spectra and the distributions of envelope fields demonstrate clear separations between these three classes of events. The localized wavepackets have approximately Gaussian power spectra. They have very flat distributions at high fields, qualitatively consistent with recent analysis of localized events in type III sources observed by Ulysses, that are inconsistent with stochastic growth theory (SGT). Meanwhile the extended chains have power spectra with a central component and one or more relatively flat components at higher frequency. Preliminary indications are that the chains have envelope field distributions that are not inconsistent with SGT. Second, analyses are reported of Vlasov simulations of time-varying chains of Langmuir wavepackets driven by an electron beam, previously interpreted in terms of kinetic localization and associated trapping. The Vlasov power spectra and envelope distributions have strong similarities to those for

STEREO's extended chains. This suggests that kinetic localization is relevant to the extended chains observed by STEREO, although SGT may be relevant simultaneously. Ongoing efforts to refine and extend these results will also be reported.