



Effects of density inhomogeneities on the statistics of Langmuir waves in the solar wind

Patrick Guio (1) and Arnaud Zaslavsky (2)

(1) University College London, Physics and Astronomy, London, United Kingdom, (2) Harvard-Smithsonian Center for Astrophysics, USA

Large-amplitude and spatially localised Langmuir waves are frequently observed in the solar wind, usually destabilised by energetic electron beams. Recent modelling using the high-frequency component of the Zakharov equations with terms describing the beam and a prescribed inhomogeneous density background, as in the solar wind plasma, are in good agreement with in situ observations by the TDS instrument on board the STEREO spacecraft (Zaslavsky, 2010). This study showed that the presence of strong density fluctuations could notably modify the observed waveforms and their amplitude. Here we go further in this study, describing the background solar wind plasma as a turbulent time- and space-fluctuating medium, and show how the phenomenon of Langmuir wave reflection by the density inhomogeneities can affect the statistical properties of the waveform and the envelope field.