EGU22-12087
https://doi.org/10.5194/egusphere-egu22-12087
EGU General Assembly 2022


# Generation of fine structures in interplanetary type III radio bursts induced by density inhomogeneities in the ambient plasma

**Immanuel Christopher Jebaraj**[1,2], Jasmina Magdalenic[1,2], Vladimir Krasnoselskikh[3], and Stefaan Poedts[2,4]

[1]Royal Observatory of Belgium, SIDC, Brussels, Belgium (immanuel.jebaraj@oma.be)
[2]Center for mathematical Plasma Astrophysics, Department of Mathematics, KU Leuven, Celestijnenlaan 200B, B-3001 Leuven, Belgium
[3]LPC2E/CNRS, UMR 7328, 3A Avenue de la Recherche Scientifique, Orleans, France
[4]Institute of Physics, University of Maria Curie-Sklodowska, ul. Radziszewskiego 10, PL-20-031 Lublin, Poland

Solar radio bursts have been studied for over 60 years, however some aspects of their generation and propagation remain to be open questions to the present day. It is generally accepted that majority of solar radio bursts observed in the corona is via the coherent plasma emission mechanism, and a substantial amount of work has been done to support this idea. Fine structures in solar radio bursts can therefore provide important input for understanding the background plasma characteristics. The presently available advanced ground-based radio imaging spectroscopic techniques (using e.g. LOFAR, MWA, etc.,) and space-based observations (Wind, STEREO A & B, Parker solar probe, Solar Orbiter) provide a unique opportunity to identify, and study fine structures observed in the low corona and interplanetary space.

In this study, we focus on the radio fine structures observed in range of the hecto-kilometric wavelengths that were much less studied than the one in the metric-decametric range. We present for the first time three different types of fine structures observed in interplanetary type III radio bursts (radio signatures of fast electron beams propagating via open and quasi-open magnetic field lines). The presented fine structures show spectral characteristics similar to the striae-like fine structures observed within the type IIIb radio bursts at decametric wavelengths. We employ the probabilistic model for beam-plasma interaction to investigate the role of density inhomogeneities on the generation of the striae elements. The results suggest that there is a good correlation between the width of the striae elements and the scale of density inhomogeneities found in interplanetary space.