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Is Interplanetary Type II Radio Emission Caused by Plasma Radiation?

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Transient, slow-frequency-drift interplanetary (IP) radio emissions observed at decameter, hectometer, and kilometer wavelengths share many attributes with coronal type II radio bursts and are therefore usually classified as ‘‘IP type II bursts", ‘‘emissions", or ‘‘events". IP type II radio emission is widely attributed to plasma radiation excited by passage of a shock driven by a fast coronal mass ejection. The presumption that plasma radiation is the relevant mechanism for all IP type II emissions is considered here. Using dynamic spectra from the WIND/WAVES experiment several radio events are considered. Unlike coronal type II bursts and majority of interplanetary type II radio emissions, the radio emission from these IP type II events varies smoothly in time and frequency and possess frequency bandwidths several times larger than is typical for most coronal and IP type II emissions. I suggest that these particular IP type II radio events may not be due to plasma radiation but, rather, incoherent synchrotron radiation from mildly relativistic electrons entrained in the CME magnetic field, or in the sheath region between the shock and the CME driver. These events are referred to as IP type II-S events. As such, they may constitute a distinct class of interplanetary radio phenomenon.