Stationary Type IV bursts: A study of their Structure and Polarisation

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During their evolution in the solar corona, CMEs are usually associated to radio sources, which are related to the magnetic configuration of the solar corona. In particular, stationary type IV radio bursts are associated to electrons trapped in close magnetic configurations, more often observed at the place of the CME eruption. Since the CME magnetic structure remains rooted to the Sun close to the place of post-flare loops, in this work we aim to investigate if the stationary type IV emission comes from the base of the CME structure, and if electrons are emitted via plasma emission. We conducted a detailed analysis of radio observations (The main tool is the Nançay Radio Heliograph. Supporting spectrographic observations are provided by Nançay Decametre Array, ARTEMIS, ORFEES, Wind/Waves spectrograph), remote-sensing observations of the corona in extreme ultraviolet (EUV) and white light as well as time histories of SXR flux measurements by GOES satellites in the 0.1-0.8 nm, to study the evolution of seven radio sources and to identify the emission mechanism associated to them. We found that stationary type IV sources were, effectively, located close to the post-flare loops structures at the base of the respective CMEs. They also presented substantial polarisation degree in the o-mode as well as high values of brightness temperature which confirms that emission mechanism associated to these sources is plasma emission. Since plasma emission mechanism is directly associated with the orientation of magnetic field, the polarisation of stationary type IV radio sources represents a potential tool to derive the orientation of expanding magnetic structures related to CMEs in the solar corona.

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