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Observational Characteristics and Possible Emission Mechanism of Moving Type-IV Solar Radio Bursts

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Solar type-IV radio bursts are broadband continuum emission, observed at metric wavelengths. They are further classified as the moving t-IV (t-IVm) and static t-IV bursts, generally believed to be excited by energetic electrons trapped within magnetic structures in the corona. The moving one is of special interest here, which is mostly relevant to coronal mass ejections (CMEs). Given knowledge of the underlying emission mechanism, the radio burst can be used to reveal information about CMEs, as well as properties of energetic particles. Different emitting mechanisms have been proposed, including the synchrotron and gyro-synchrotron emission, the plasma emission, and the z-mode maser emission.

Latest studies with a combined analysis of data observed simultaneously at metric wavelengths by NRH and at EUVs by AIA/SDO show that t-IVm bursts are associated with the AIA-observed high-temperature eruptive structure, likely the flux rope structure that drives the eruption. These observational studies point to the z-mode maser emission to be the possible radiation mechanism of t-IVm. Further calculations using plasma kinetic theory and particle simulation seem to support this argument. This presentation will summarize these observational and theoretical efforts in understanding the origin of t-IVm radio bursts.

References

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