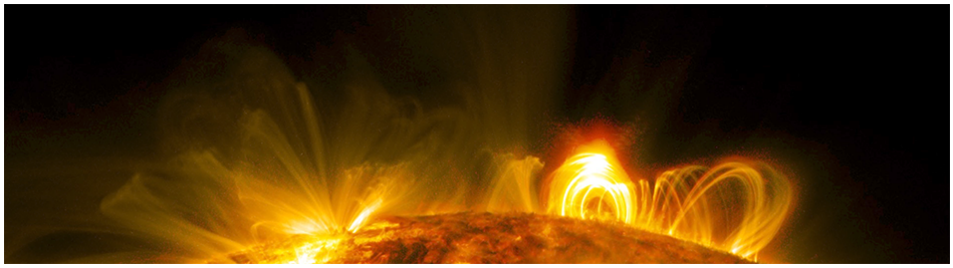

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# Constraints on the acceleration region of type III radio bursts from radio bursts and X-ray bursts

*Wednesday, 17 November 2021 09:15 (15 minutes)*

During the gradual phase of flare SOL2017-09-09T10:50, a faint increase of non-thermal X-ray emission has been detected by Fermi/GBM, and is associated with radio decimetric spikes and type III radio bursts detected by the ORFEES radio-spectrograph, the LOFAR radio-telescope, and the Wind/WAVE instrument. These signatures indicate that a faint acceleration event was the source of electron beams propagating to the heliosphere. We show that the non-thermal X-ray bursts and radio decimetric spikes correlate on short time scales, which support the idea that the fragmentation of the radio emission into spikes is linked to the fragmentation nature of the acceleration process itself. The combination of HXR and radio diagnostics in the corona is used to provide strong constraints on the density of the acceleration site. Using spectroscopic imaging of the radio emission at lower frequencies using the LOFAR observations, and the constraints on the acceleration site derived from the X-ray and higher frequency radio emission, we show that the observed radio source sizes are much larger than the expected size of the electron beam in the high corona, confirming that radio source properties are strongly affected by radio-wave scattering due to turbulent density fluctuation of the ambient plasma.

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