

Investigation of pre-flare type III solar radio bursts and their potential solar origins

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Type III solar radio bursts are characterized as the fast-drifting radio emissions in a dynamic spectrogram, which is believed to be produced by the propagating electron beams and often accompanied with the solar flares or magnetic reconnection. Studying the type III radio bursts in high-frequency range before flares would be important for understanding the trigger of energy release although it is rarely reported previously. Here we present two pre-flare type III burst events found in the range of 2.6-3.8 GHz at Solar Broadband Radio Spectrometer (SBRS). By comparing with the SDO/AIA multi-wavelength observations in flare active regions, the pre-flare type III radio bursts have good temporal correlations with the increases of EUV emissions. Furthermore, we find that one event is related to the EUV brightening with 1-min delay, implying the existence of plasma heating before energy release. The other event has a simultaneous EUV jet with a speed of ~ 700 km/s indicating the occurrence of magnetic reconnection. We suppose both pre-flare events are associated with small-scale energy release via magnetic reconnection.

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