

Multi-wavelength Observations of Pre-flare Quasi-periodic Pulsation in the C2.2 Flare on 2012 October 15

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Quasi-periodic pulsation (QPP) is thought to be the nature of solar flares, which can be observed during and before flares in various wavelengths, such as the radio, microwave, SXR, and EUV. In this study, we analyze a pre-flare QPP event on 2012 October 15 and its association with the following C2.2 flare based on the radio data in the ranges of 2.81-2.85 GHz and 2.91-2.95 GHz from Solar Broadband Radio Spectrometer (SBRS), EUV images from AIA multi-wavelength observations, and wavelet analysis. Our result show that the main period of the radio QPP is ~ 800 s which is similar to the period of ~ 13.5 min obtained in SXR by Tan et al. (2016). Moreover, we analyze several localized areas in the flare-eruptive AR 11593 to search for the possible regions responsible for the occurrence of pre-flare QPP. We find that the footpoints of brightening loops in 211 Å show the quasi-periodic behavior of ~ 850 s. It is thus suggested that the pre-flare QPP with a period of 13-15 min can be manifested in both of the thermal (SXR, EUV) and nonthermal (radio) radiation processes. The relationship between the pre-flare QPP and the subsequent C2.2 flare will also be discussed.

Keywords: sun, solar flares, solar oscillation