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Quasi-Periodic Pulsations During the impulsive phase of a C1.8 Confined Flare

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Quasi-periodic pulsations (QPPs), characterized by periodic variations in flux, are universally observed during solar flares. QPPs are believed to be intimately related to the modulations of the flare energy release or transport processes. However, up to date, there is no conclusive interpretation of their physical nature. Here, we report a C1.8 confined flare on 2016 February 18. During its impulsive phase, radio and X-ray QPPs are observed. Utilizing the radio spectroscopic imaging technique provided by Karl G. Jansky Very Large Array (VLA), we found four distinct periodic radio sources in 1.0-2.0 GHz. One is apparently right-hand-polarized. It locates close to a large sunspot with a relatively high brightness temperature reaching 20 MK. It covers nearly the whole band in 1.0-2.0 GHz with a period of ~6 seconds. The other three relatively weak radio sources are located along a corona loop, two at different footpoints (with different polarization) and one at the loop top region. Their periods differ from 25 to 47 seconds. Concurrent X-ray QPPs are also observed from Fermi/GBM with a period of ~43 seconds. We present a detailed study of all the sources and their correlation, and discuss their physical nature and the energy release, transport, and modulation processes in the event.

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