

Title: Coordinated flare observations with the Jansky Very Large Array

Main Objective: We request Hinode and IRIS coordination to support flare observations using the Jansky Very Large Array.

Scientific Justification: We request Hinode and IRIS coordination to support flare observations by the Jansky Very Large Array (VLA) at radio wavelengths. The VLA can image the Sun with unprecedented high cadence (50 ms), spectral resolution (up to 1 MHz, or  $\sim 0.1\%$  of the total bandwidth), and spatial resolution ( $\sim 10''$ ). Its unique capability of imaging coherent radio bursts at decimetric radio wavelengths allows tracing flare-accelerated electrons to their origin: the flare energy release site. Meanwhile, X-ray and EUV observations provide important complementary information of the flare geometry, dynamics, and plasma heating. The recent discovery of a solar flare termination shock (Chen et al. 2015, Science, 350, 1238) has clearly demonstrated the power of using such multi-wavelength observations to study flares. We have been awarded 30 hours of VLA time to observe solar flares from 2016 Feb 5 to Apr 25. The VLA observations will be supported by the New Solar Telescope and the Owens Valley Solar Array. We will also propose for IRIS coordination.

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Dates: ToO. The VLA observations will be from 2016 Feb 5 to Apr 25. We will perform  $\sim 6$  individual solar pointings, each lasting about 5 hrs during the local daytime at the VLA site.

Time Window: Each  $\sim 5$ -hr VLA solar pointing will occur during the local daytime at the VLA site (MST=UTC-7). The time windows (when the Sun is  $>10$  deg above the horizon) from February to April are as follows: - February 2016: 1500 UT to 2330 UT - March 2016: 1430 UT to 0000 UT - April 2016: 1400 UT to 0030 UT The optimum observing time (to achieve the best resolution and imaging quality) is around the local noontime ( $\sim 1900$  UT). Short interruptions during the observations are not preferred, but possible.

Target(s) of interest: A productive active region that frequently generates C-class flares and above.

SOT requests: What is the designated mode for observing filaments together with NST? Ca II or H-alpha, maybe?

EIS requests: Normal flare response

XRT requests: For on-disk active regions, high-cadence thin-Be flare response;  
For active regions on the limb, CME watch with a deeper exposure

IRIS requests: large sit 'n' stare, 1330 SJI only, 8 sec cadence. If rolls are allowed, roll perpendicular to the neutral line (for disk flares), or perpendicular to limb (for limb flares).

Additional instrument coordination: VLA, NST, Owens Valley Solar Array

Previous HOPs: None

Additional remarks: When an opportunity arises (i.e., a productive AR appears at the east limb), we would like to observe it two or three times as it moves across the solar disk.