



The Sun as a test case for a SKA test site

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URSI
LISBOA

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Suppose we have an ambitious test site for an instrument around 1 GHz

Sparse interferometer (~ 12 antennas)

Low but not terribly poor resolution (500m to 1 km longest baselines)

Reasonably big field of view

Scientific case?

Do we really need one?

probably interplanetary scintillation close to the Sun, near the region where solar wind is accelerated

space-weather tool?

multifrequency? solar wind maps?

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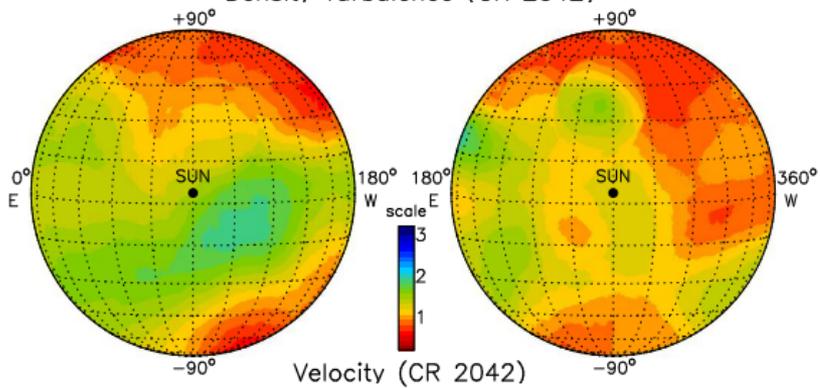
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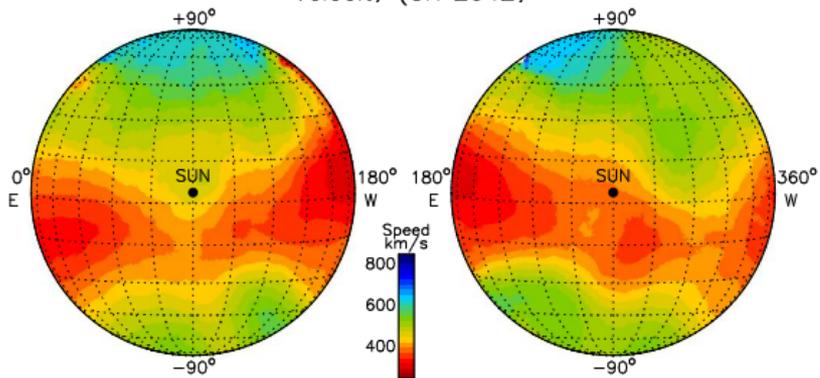
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Density Turbulence (CR 2042)



Velocity (CR 2042)



What we really want is to test features that can be used for SKA, namely making images.

Need a source that is “big” and with substructures on the scale of arcmin.

Preferably a strong source and stable source (poor instantaneous UV coverage, need to use synthesis maps for a few hours at least)

The quiet Sun fits all these criteria, and presents other advantages (dedicated instruments like the Nançay RH, and the Inner Mongolia RH) that can be used for comparison.

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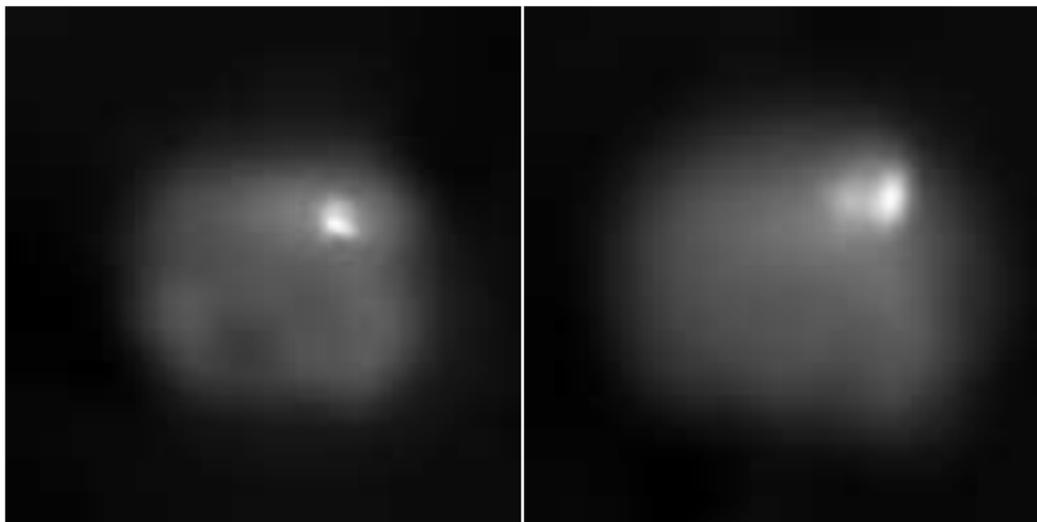
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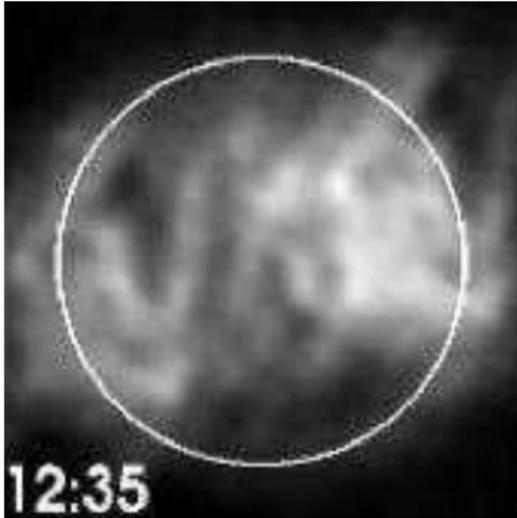
Radio images with ~ 600 visibilities, Nançay RH.



Images from Nançay Radioheliograph on 1998 April 20, in 327 MHz (left) and 164 MHz (right). The smooth disk corresponds to the thermal emission, with weak bright non-thermal noise storms also seen.

The Sun is “larger” at 164 MHz.

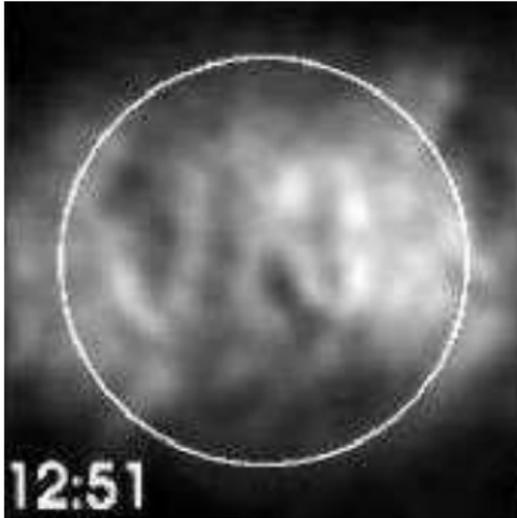
Radio imaging of the precursor to CME cavity. Notice the strong aliasing.



Nançay RH image
Notice coronal holes.

Ref: Marqué et al (2002;2004).

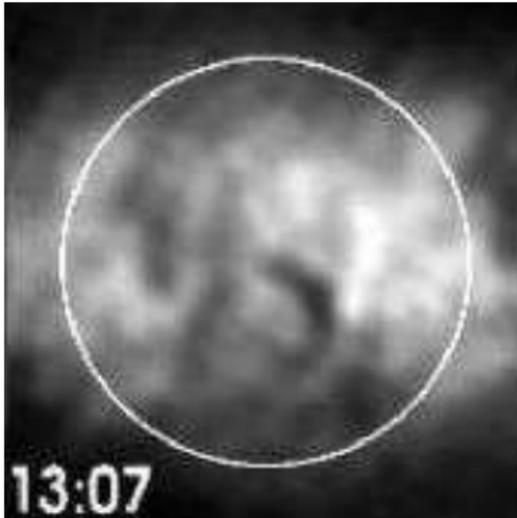
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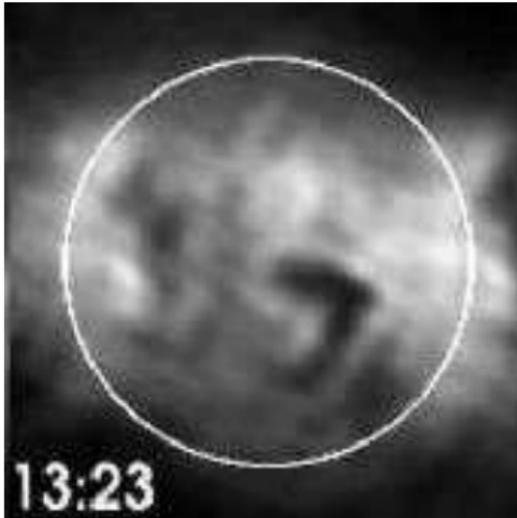
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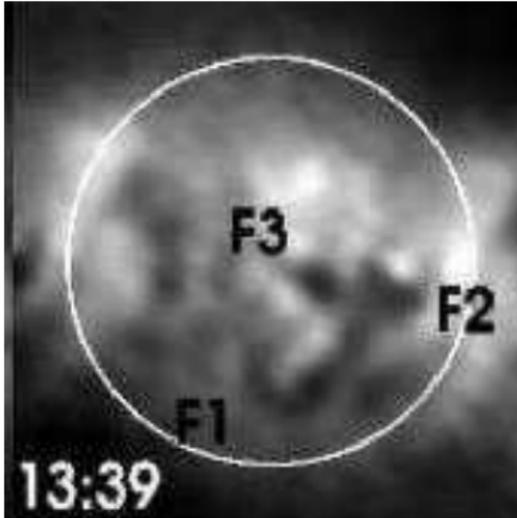
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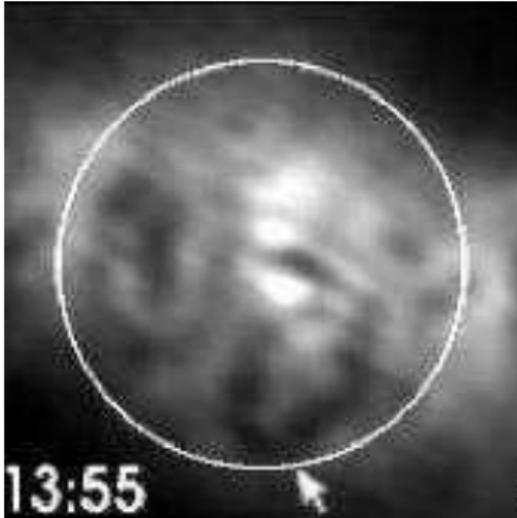
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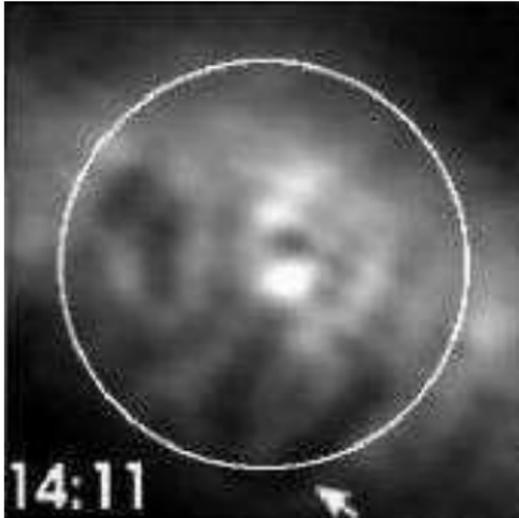
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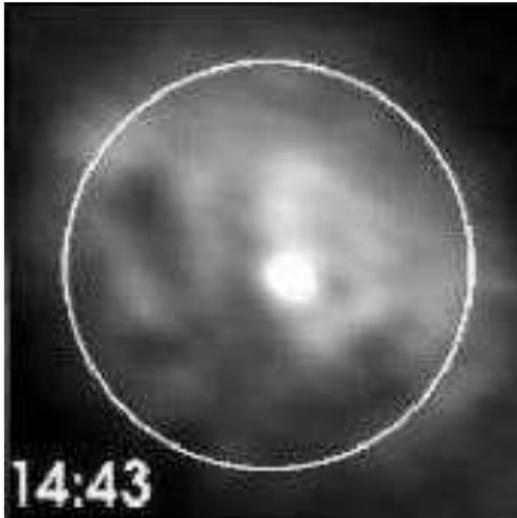
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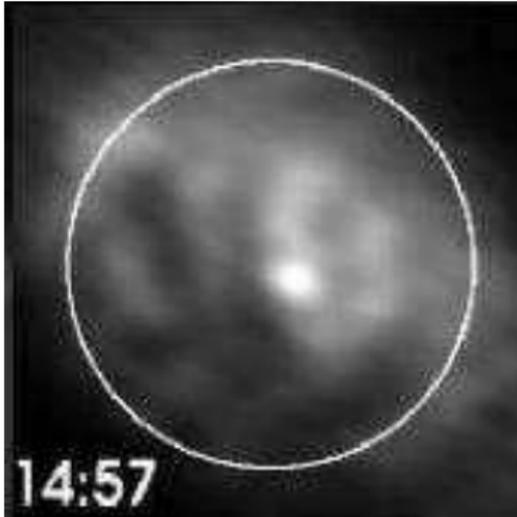
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large Conclusions

Solar radioastronomy techniques can work in several ways in relation to a test-site for SKA, by providing:

- a scientific case
- a monitoring tool framework
- a test case for image reconstruction and calibration