ASTRON

Netherlands Institute for Radio Astronomy

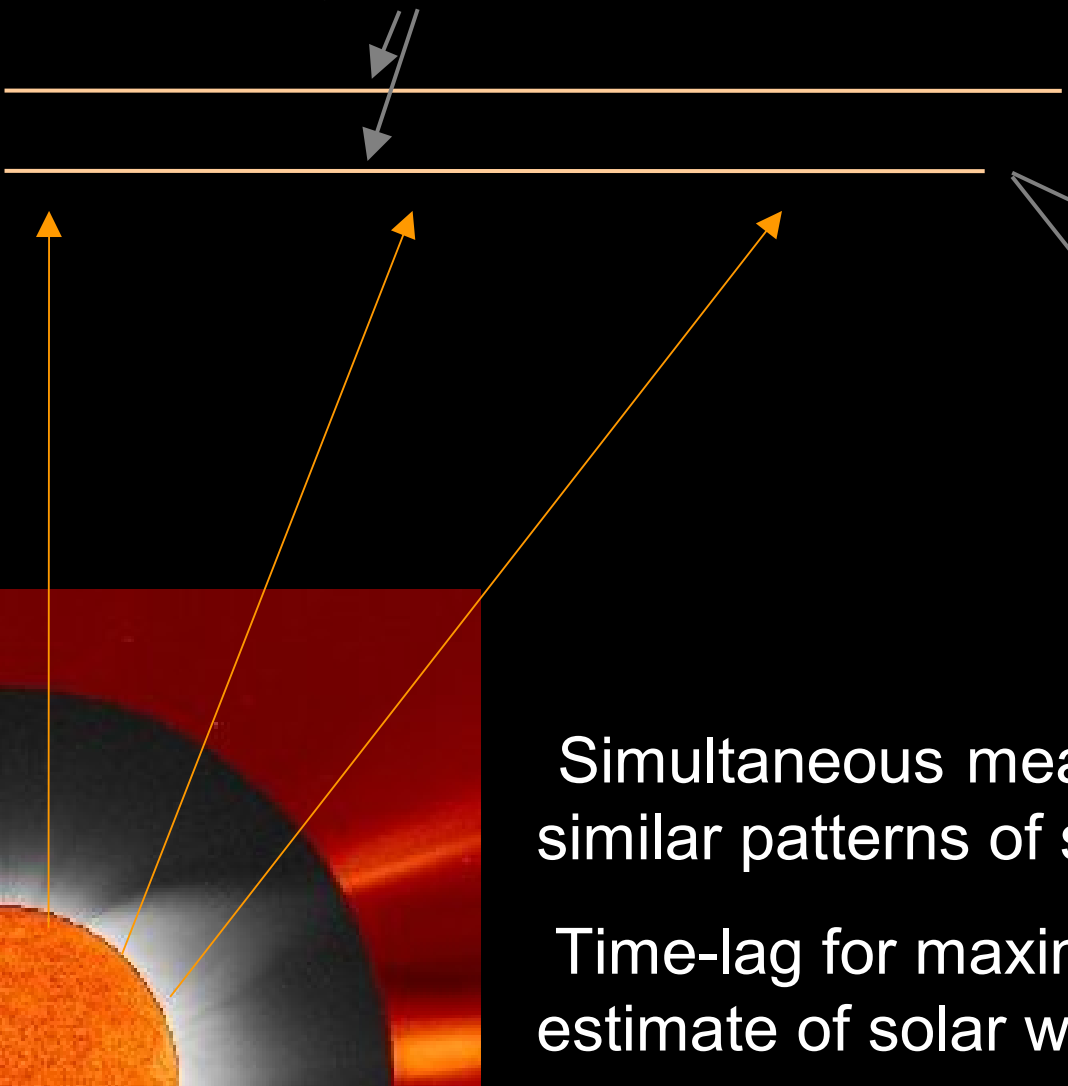
LOFAR

Solar Wind Observations with LOFAR: Recent Results

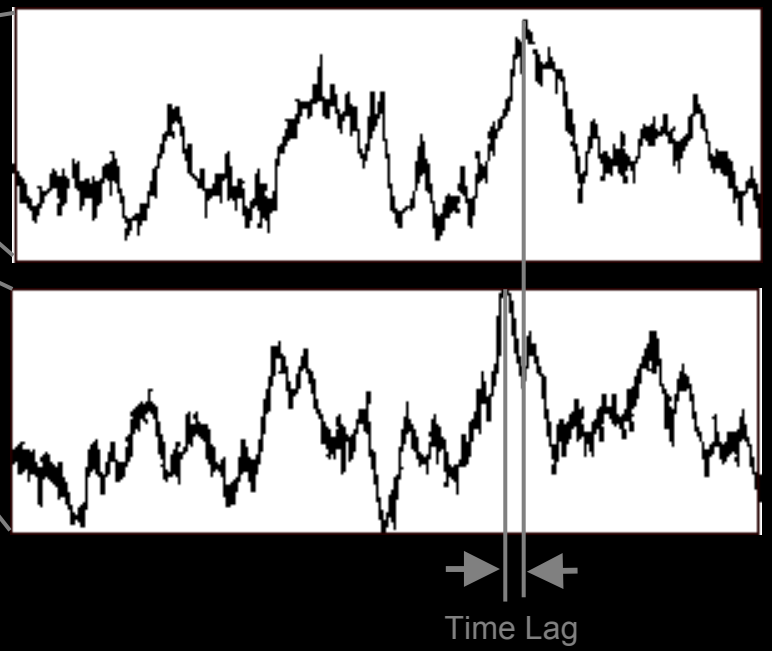
Richard Fallows

Radio Measurements

Line of sight to radio source



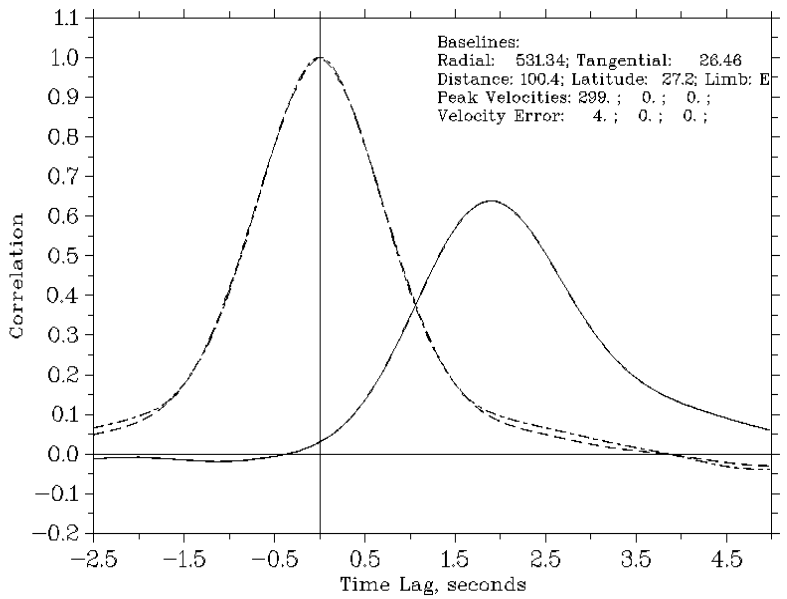
Scintillation due to turbulent-scale density variations in the Solar Wind



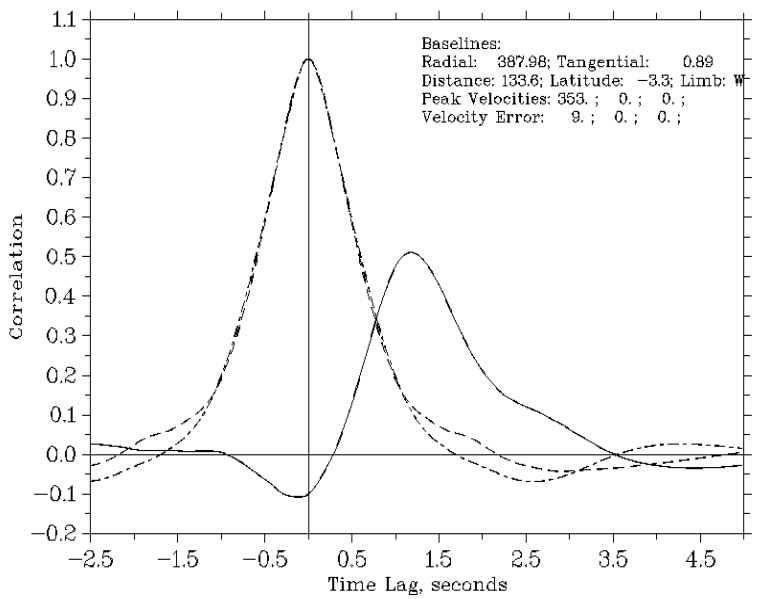
Simultaneous measurements by two antennas show similar patterns of scintillation.

Time-lag for maximum cross-correlation gives estimate of solar wind outflow speed.

Observations November 2011 International Stations

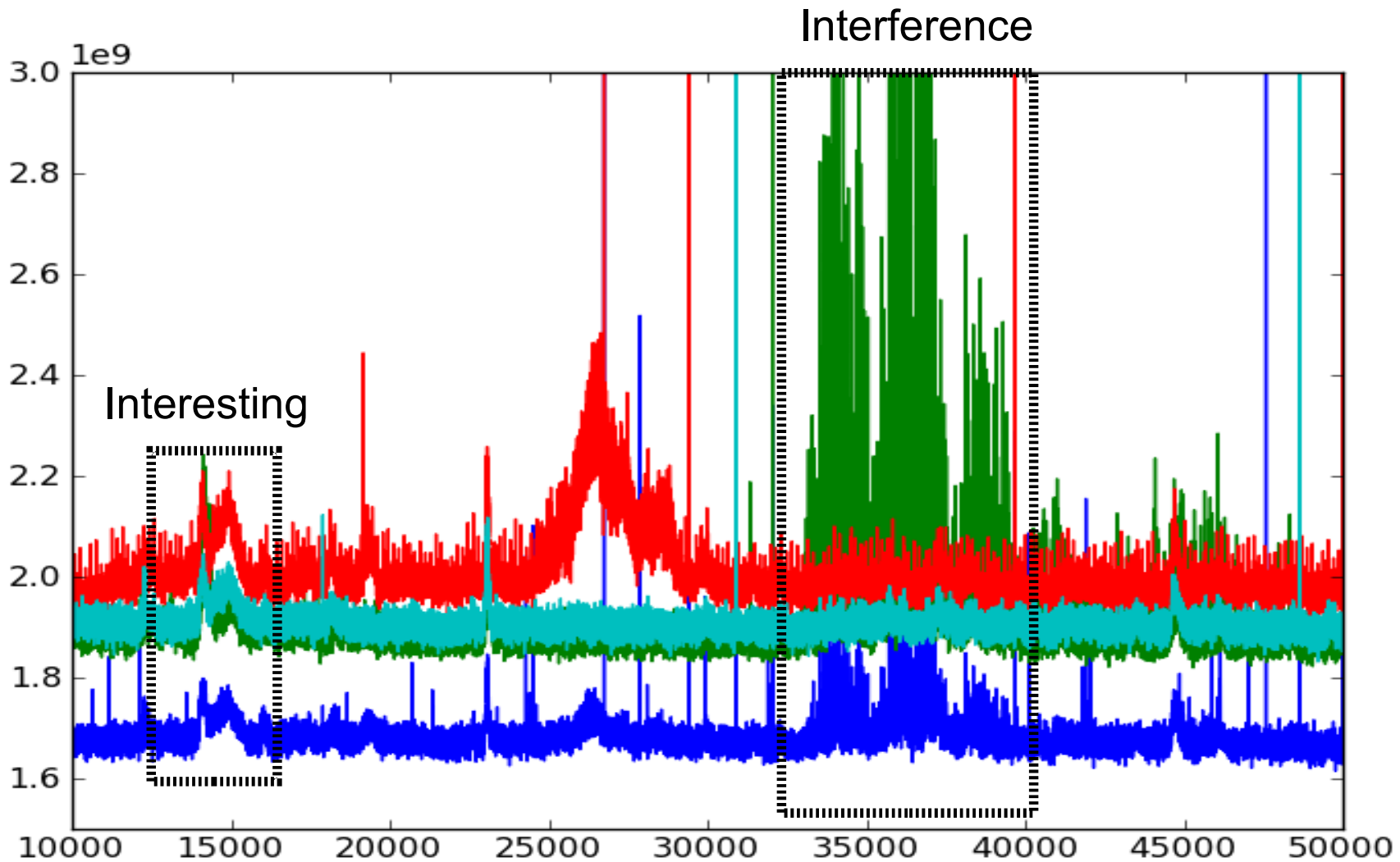


- 14th November 2011
- DE603-SE607
- 3C298

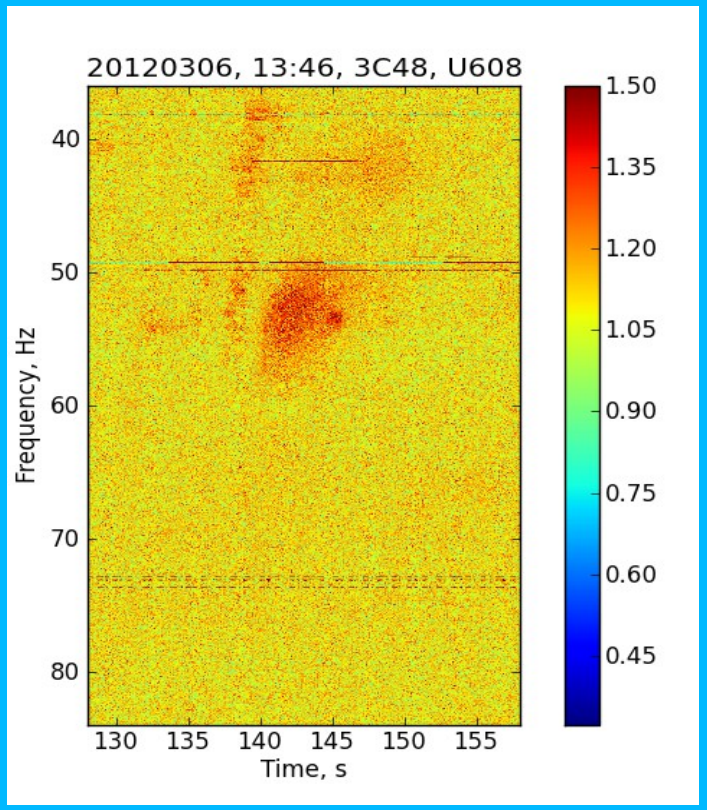


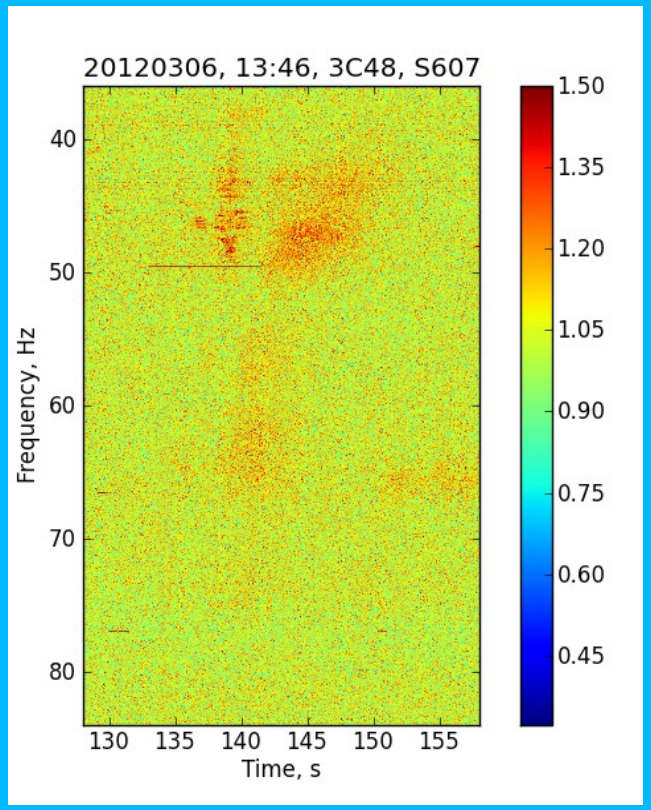
- 17th November 2011
- DE602-DE605
- 3C279
- Likely observation of CME launched on 14th November.

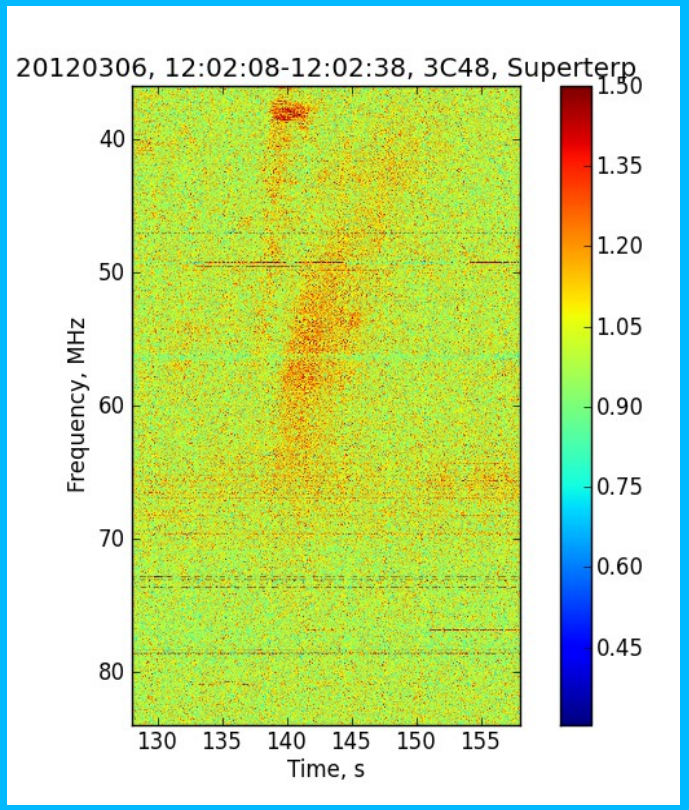
Solar Flare Radio Bursts



Observation of 3C48 on 6th March 2012 International Stations

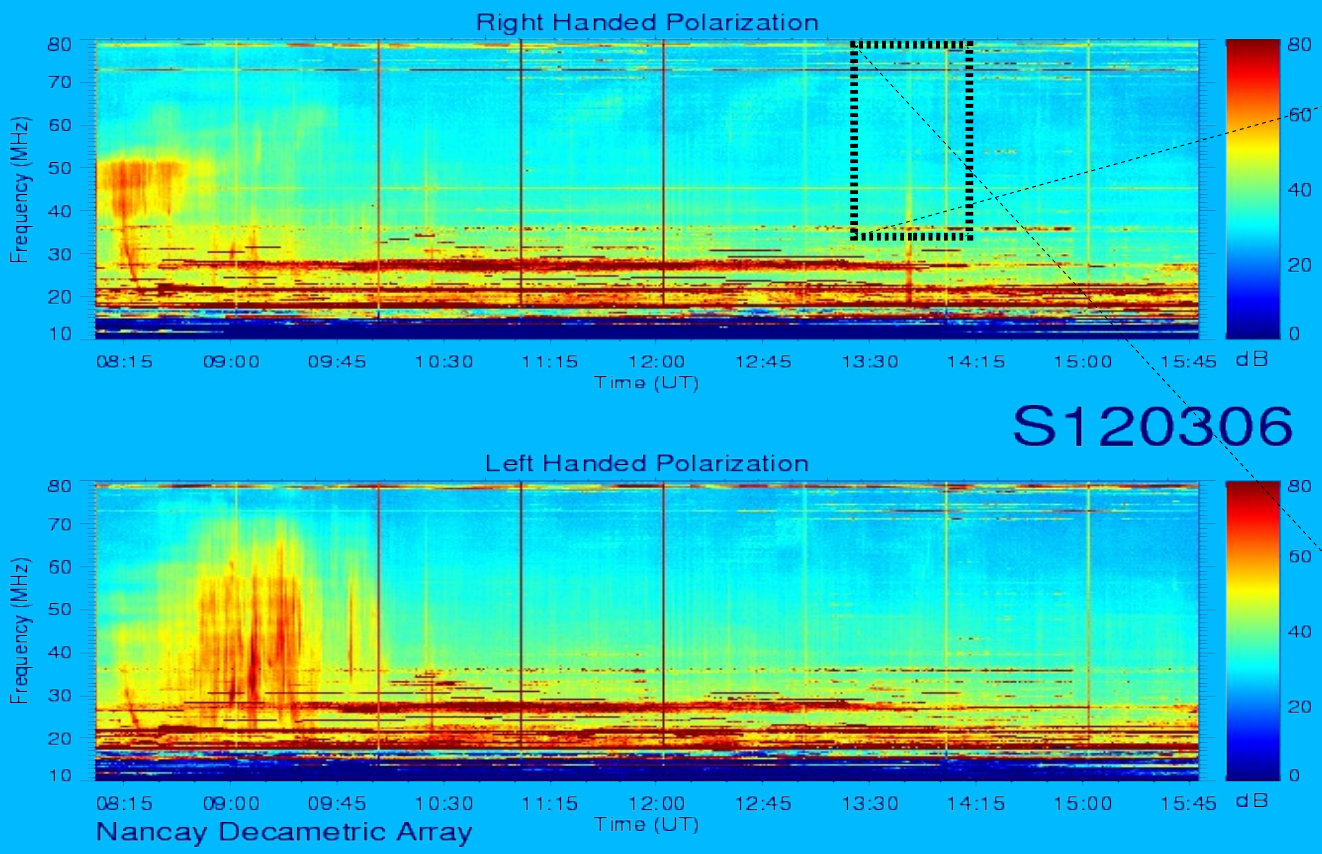


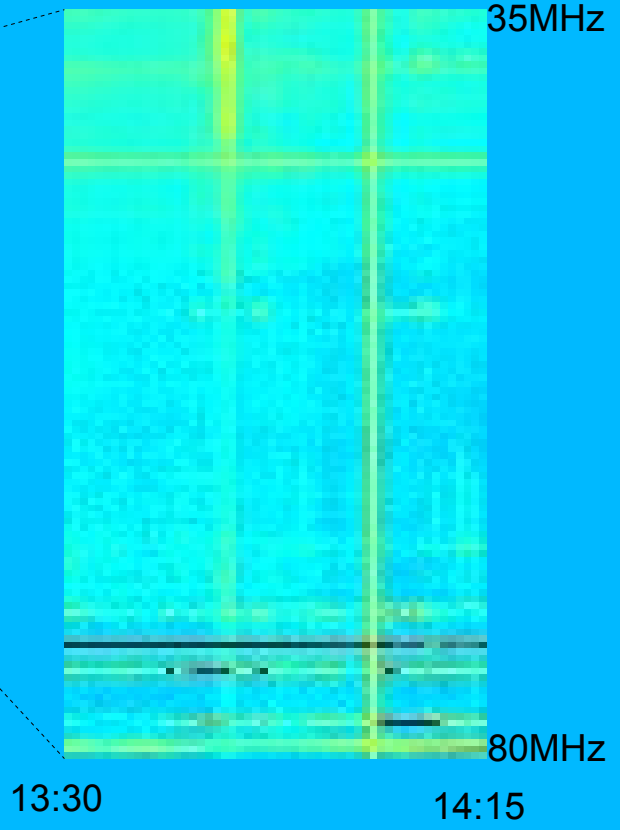




- UK608
- SE607
- Sum of all stations

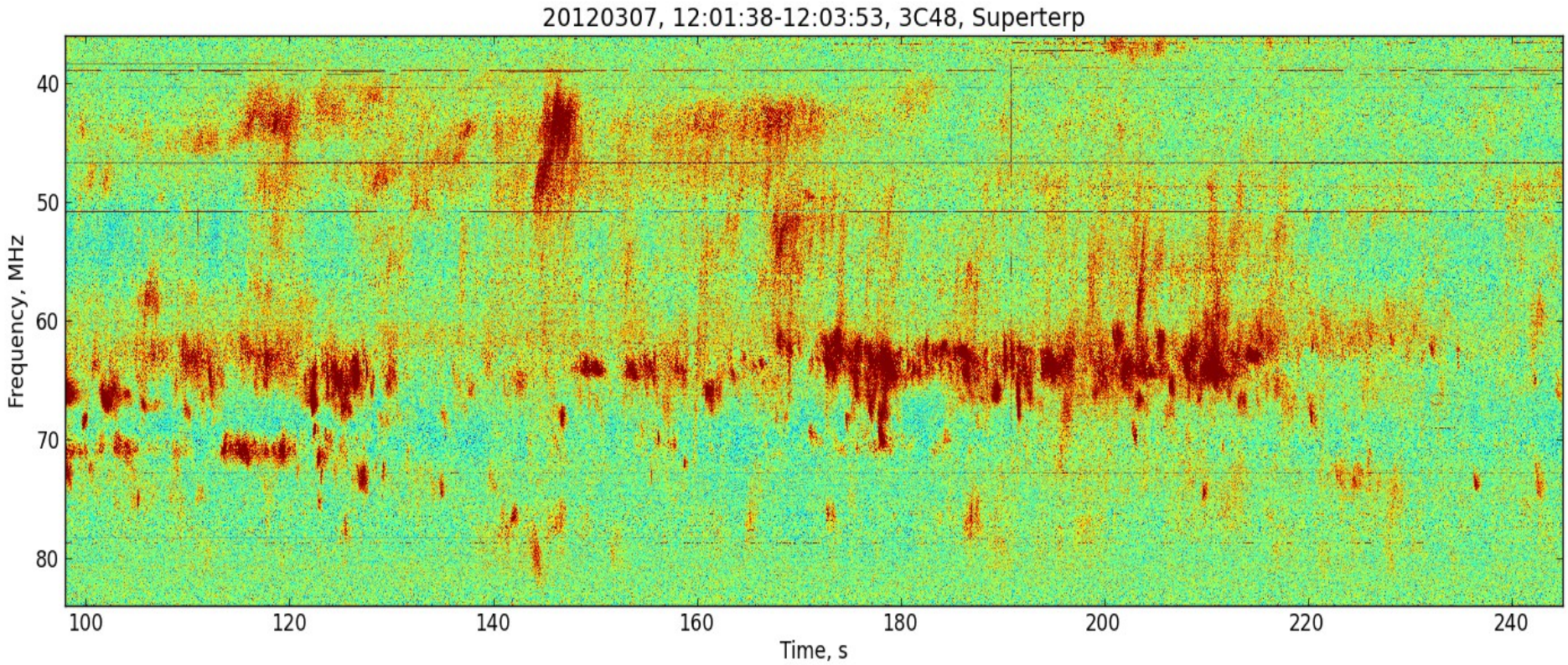
Quick Comparison with Nançay Radio-Heliograph





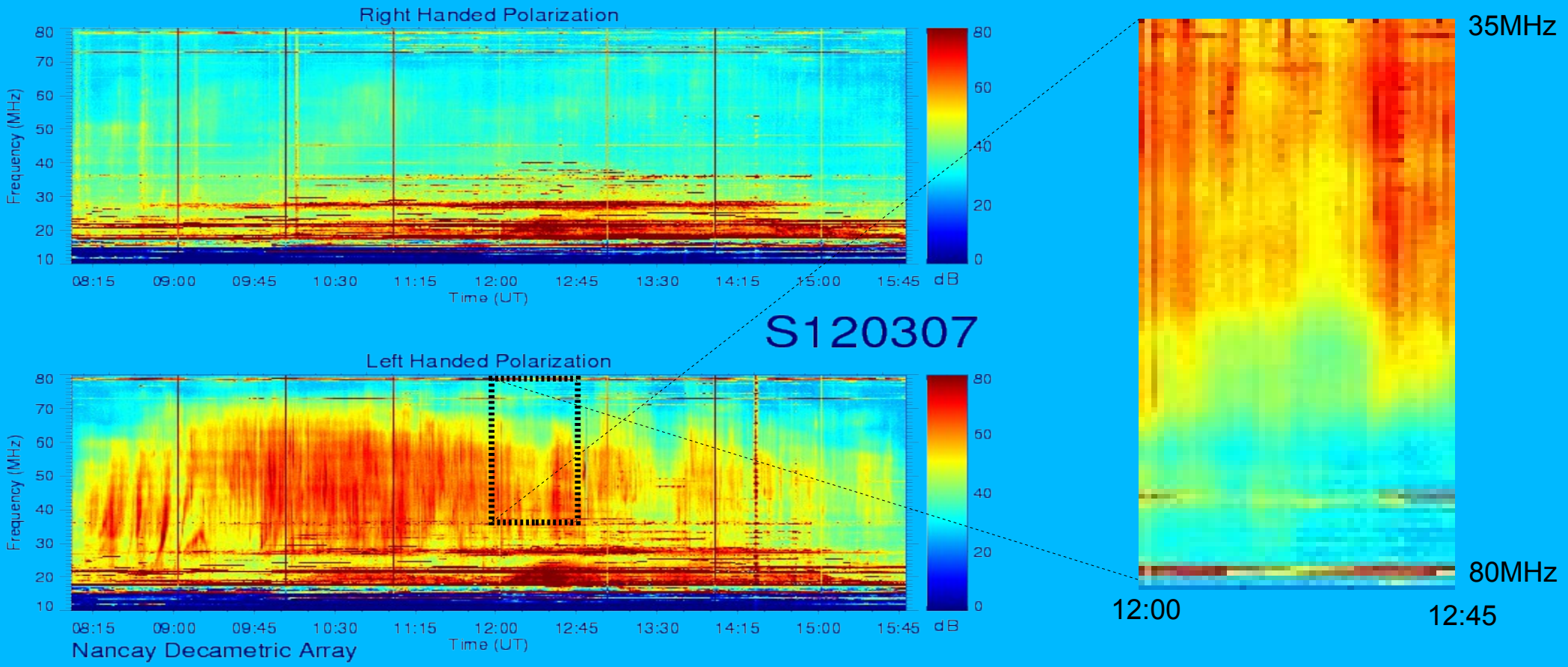
- Radio-heliograph shows some activity.
- Data integrated to 10s, so LOFAR data compressed to ~3 pixel-columns.

Observation of 3C48 on 7th March 2012 International Stations



- Sum of all stations

Quick Comparison with Nançay Radio-Heliograph



- Radio-heliograph shows a lot of activity.
- Data integrated to 10s, so LOFAR data compressed to ~15 pixel-columns.

Summary

- Cross-correlations in November 2011 show a slow solar wind stream and a CME.
- Dynamic spectra from March 2012 appear to show solar radio bursts, on observations taken 50° from Sun.
- Quick comparison with Nançay corroborate this.