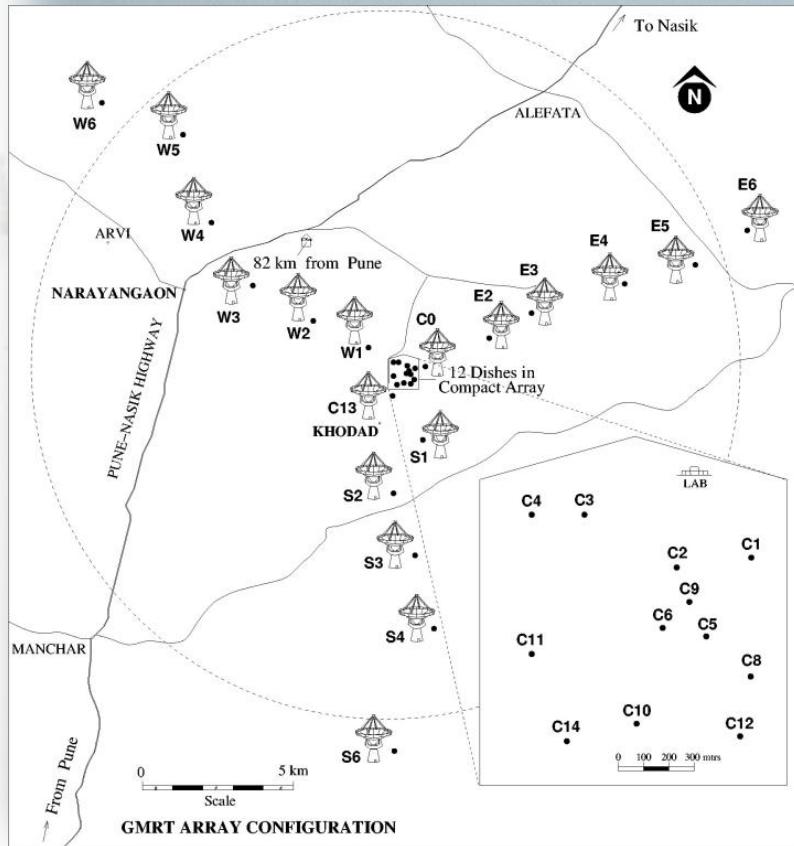


GMRT

Giant Metrewave Radio Telescope

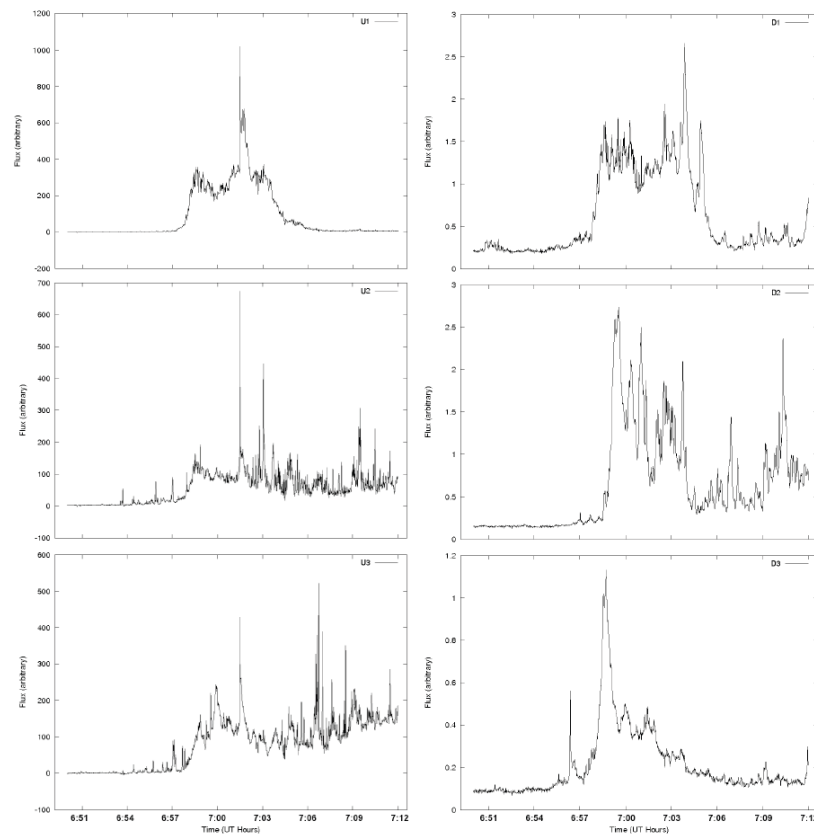


Investigations of Solar Radio Activity at 610 and 1280 MHz and its Association

with X-ray Microflares: Simultaneous radio and X-ray observations

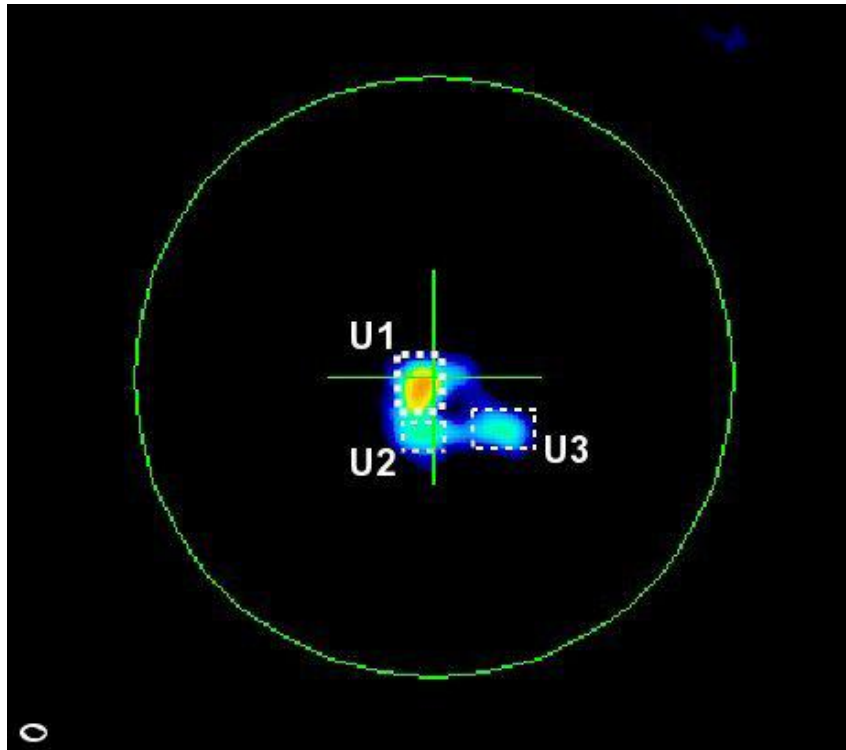
Sawant, H.S., Madsen, F.R.H., Krucker, S., Subramanian, P., Karlicky, M., Meszarosova, H., Sych, R., Janardhan, P., Susanta K.B., Rosa, R.

- Investigação de atividade solar – Microflares e Active Region Transient Brightenings (ARTB)
- Observações simultâneas em rádio e raios-x – GMRT (610/1280 MHz), Ondrejov (Spectrômetro) e RHESSI
- 36 horas alocadas (todo o tempo solicitado) para observações no ciclo 24 do GMRT (11-12/05/2013, 1-2/06/2013)
- Artigo aceito recentemente no Solar Physics (exemplo de curvas de luz obtidas com o GMRT)

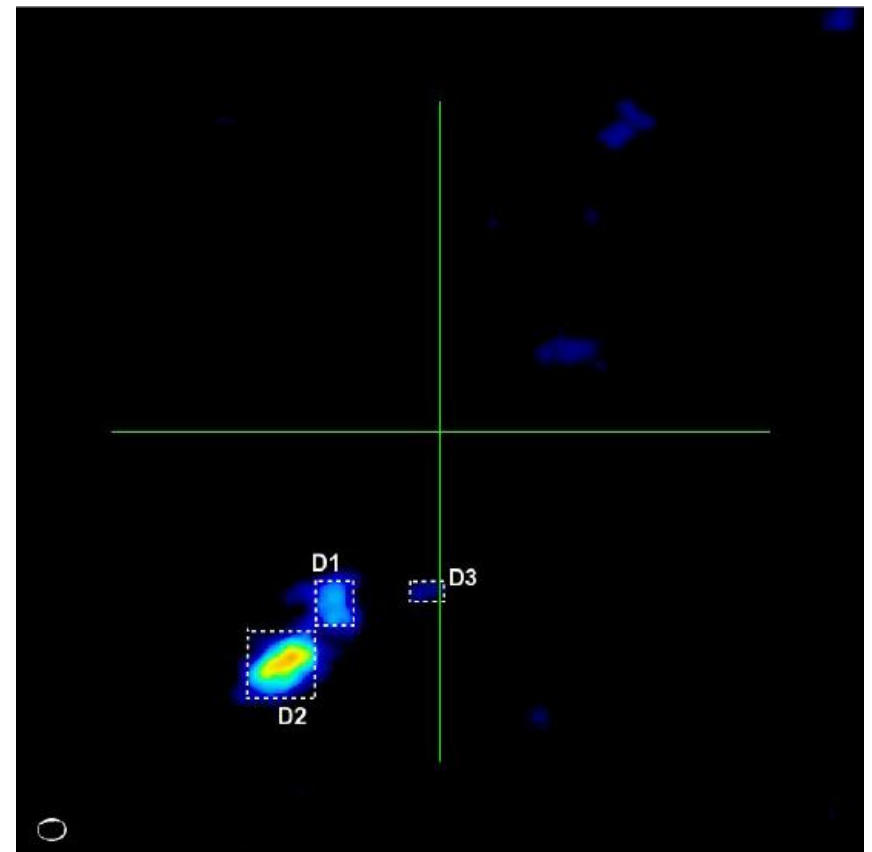


Mapas solares obtidos com o GMRT

- 244 MHz



- 611 MHz



Fast Magnetoacoustic Waves in a Fan Structure Above a Coronal Magnetic Null Point

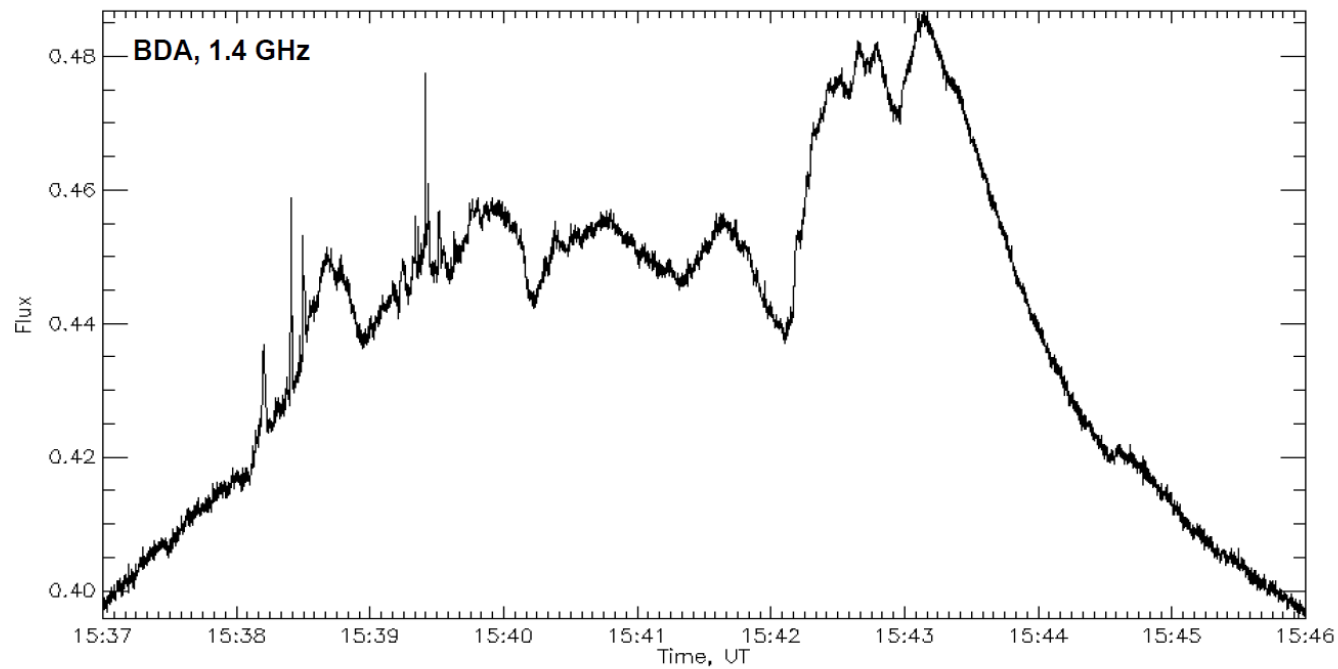
H. Mészárosová · J. Dudík · M. Karlický · F.R.H. Madsen · H.S. Sawant

National Space Research Institute

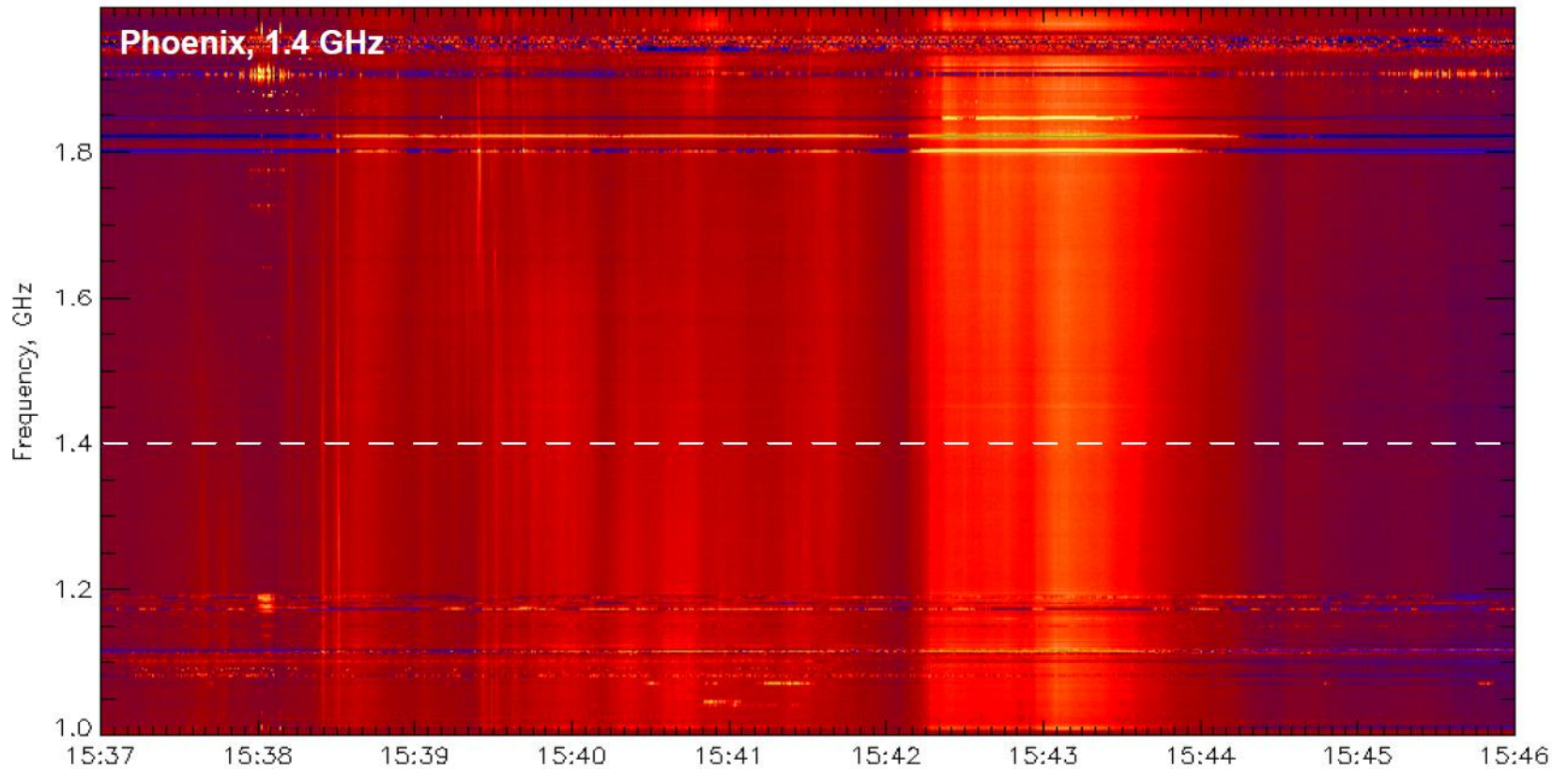
Astronomical Institute of the Academy of Sciences, Ondřejov, Czech Republic

Comenius University, Slovak Republic

- **Abstract** We analyze the 26 November 2005 solar radio event observed interferometrically at frequencies of 244 and 611 MHz by the *Giant Metrewave Radio Telescope* (GMRT) in Pune, India. These observations are used to make interferometric maps of the event at both frequencies with the time cadence of 1 s from 06:50 to 07:12 UT. These maps reveal several radio sources. The light curves of these sources show that only two sources at 244 MHz and 611 MHz are well correlated in time. The EUV flare is more localized with flare loops located rather away from the radio sources. Using SoHO/MDI observations and potential magnetic field extrapolation we demonstrate that both the correlated sources are located in the fan structure of magnetic field lines starting from a coronal magnetic null point. Wavelet analysis of the light curves of the radio sources detects tadpoles with periods in the range $P = 10 - 83$ s. These wavelet tadpoles indicate the presence of fast magneto acoustic waves that propagate in the fan structure of the coronal magnetic null point. We estimate the plasma parameters in the studied radio sources and find them consistent with the presented scenario involving the coronal magnetic null point.

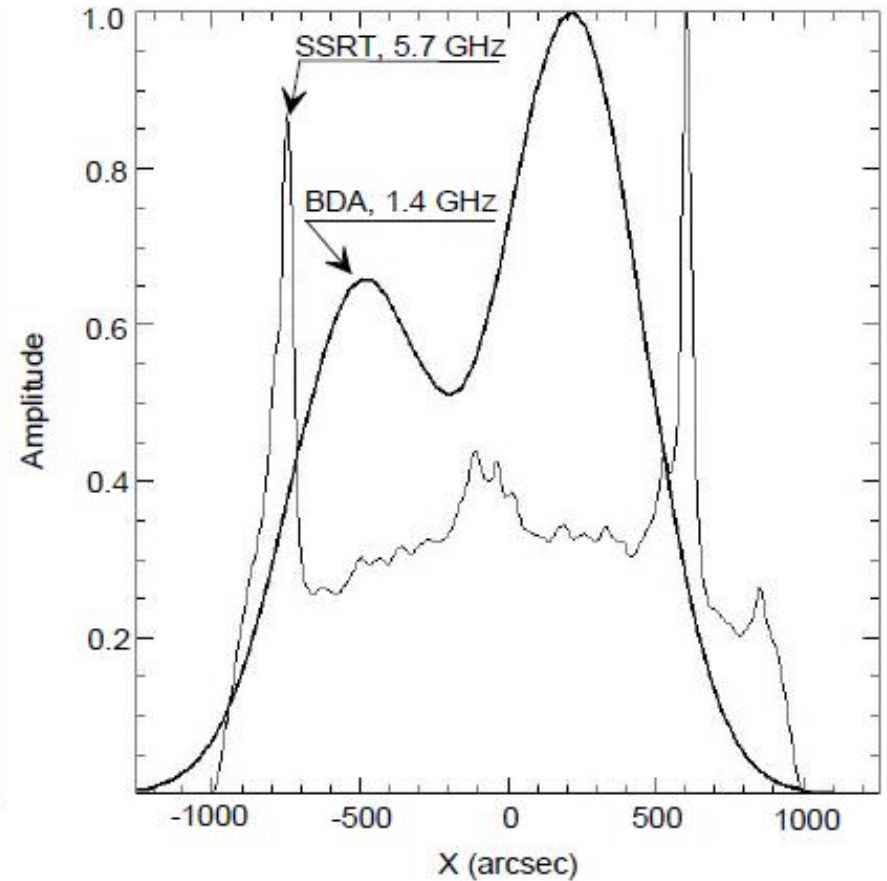
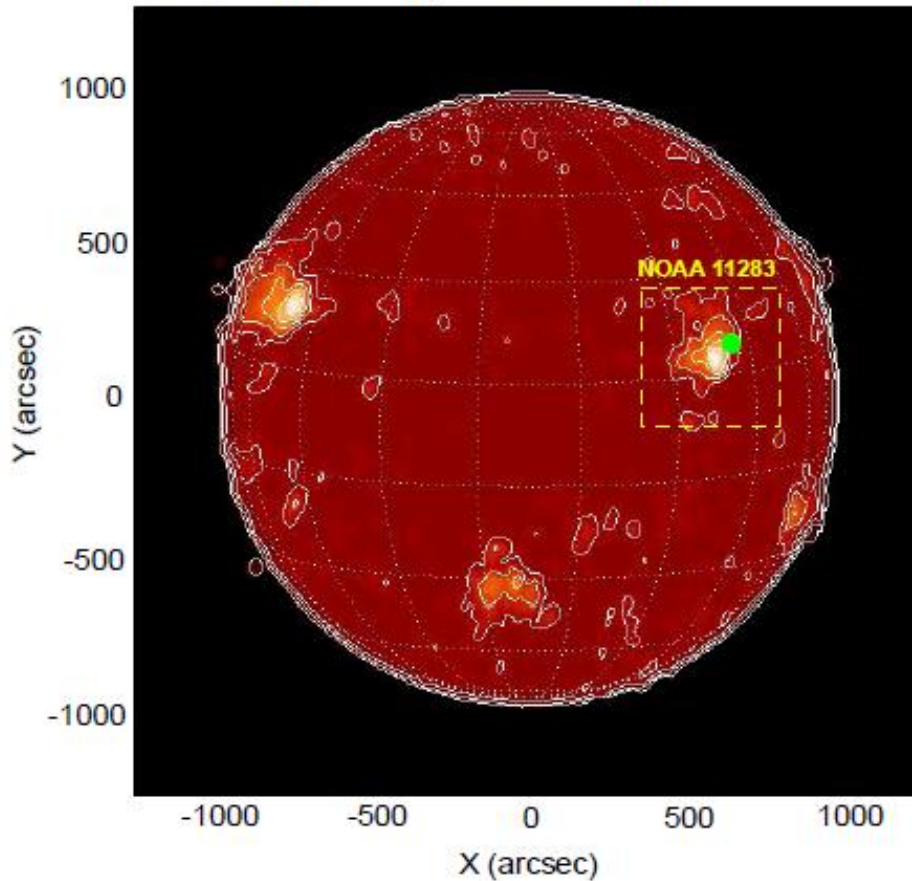


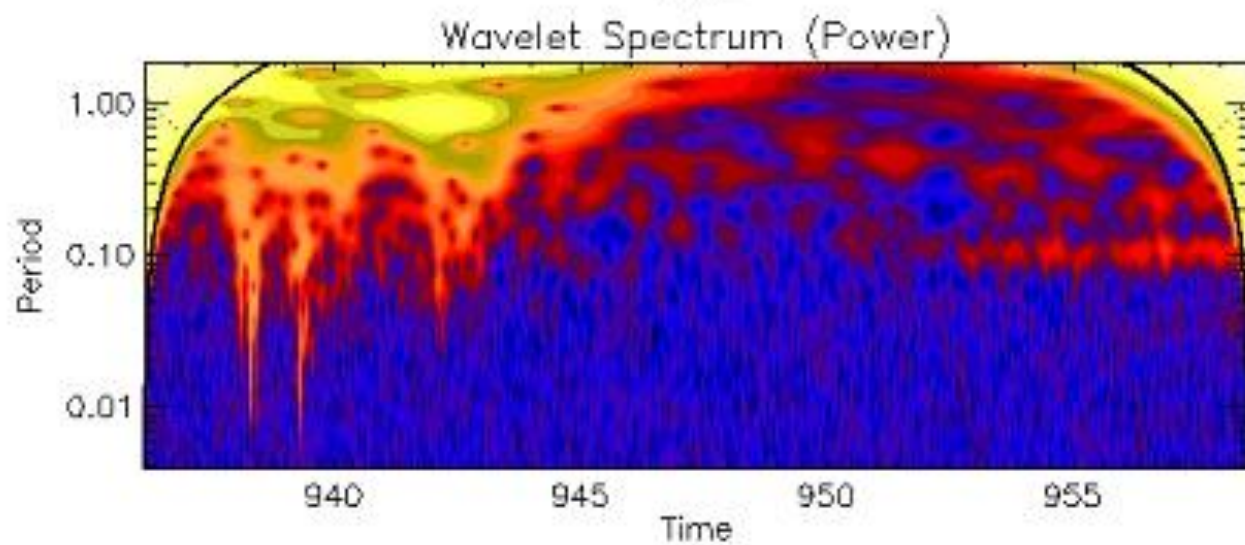
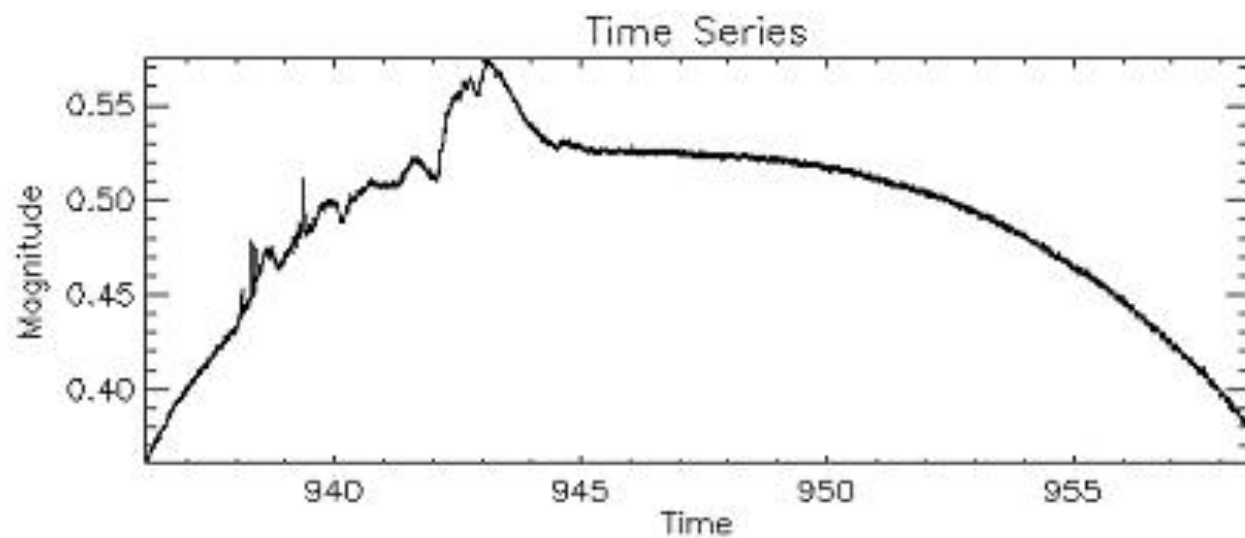
2011 Sep 08, SSRT - Dynamic spectrum



8th September 2011 M 6.7 flare

SSRT AOR 08-Sep-2011 15:20 UT





MULTI-WAVELENGTH INVESTIGATIONS OF M- AND C-CLASS OF SOLAR FLARES OBSERVED BY PBDA AND SSRT

R. Sych¹, A. Altyntsev¹, E. Ebenezer^{2,3}, F.C. R.Fernandes⁴, H.S. Sawant²

¹ Institute of Solar Terrestrial Physics, Irkutsk, Russia

² National Institute of Space Research, Sao Jose dos Campos, SP, Brazil

³ Indian Institute of Astrophysics, Koramangala, Bangalore, India

⁴ IP&D, Universidade do Vale do Paraiba, Brazil

- The Brazilian Decimetric Array (BDA) phase III will be "T" shaped radio array consisting of 38 dishes of 4 m diameter operating in the frequency range of (1.2-1.7, 2.8 and 5.6) GHz with the maximum baseline of 2.5 km in the East-West direction and 1.25 km along the South one. The BDA phase II consisting of 26 antennas will be in regular operation by the end of 2013. In the first phase known as PBDA five antennas on an East-West baseline with spacing from 216 m down to 18 m are being used for observation of the Sun at 1.4 GHz with a spatial and time resolutions of ~ 3.4 arc min and 104 ms. From August 22, 2011 for about six months the regular solar observations were carried out. Totally data for 103 solar observations consisting of 79 in transit and 24 in tracking modes are available for analysis.

Joint investigations of the solar burst activity associated with class M and C flares observed in 2011 by Siberian Solar Radio Telescope (SSRT) and prototype BDA along with spectrometers and satellite data have been reported here. In events on September 08, 2011 and October 10, 2011, the solar origin of the bursts observations at 1.4 GHz by PBDA was confirmed by different ground- and space instruments. Weak fine structures like sub - second pulses and quasi-periodic pulsations (QPP) were simultaneously recorded with the PBDA and the e-Callisto net. For November 03, 2011, November 16, 2011 and December 21, 2011 bursts we compared the PBDA time profiles with EUV data obtained by SDO/EVE/AIA. The spatial structure of active regions was obtained by the SSRT at 5.7 GHz and Solar Dynamic Observatory (SDO/AIA). For each event there were found coordinates, sizes and brightness temperatures of the burst sources. The simultaneous spatial distributions of solar microwave emission recorded with the SSRT (2D images) and with the PBDA (1D scans) are investigated.

During an impulsive phase of the burst on September 08, 2011 we have observed that a emission in the PBDA time profile oscillated as QPP with ~1 min period and overlaid wideband subsecond pulses occurred. It is suggested that pulsations observed are the manifestation of energy release during cascading reconnection of the lower magnetic loops at different time scales from sec to minutes. Details of the bursts parameters observed by PBDA, association with other activities and possible interpretations in terms of accelerations processes are presented.

Brazilian Decimetric Array

