fits the data, yet they produced no hard X-rays: this may represent a population of electrons trapped in the corona where they can continue to radiate at millimeter wavelengths without producing any bremsstrahlung X-rays (Raulin et al. 1998). Data such as these provide important constraints for models of the spatial distribution of accelerated electrons in flares.

5. Prospects During the HESSI Mission

It is planned to request a BIMA campaign for the period in the northern summer immediately following the planned launch of HESSI in July 2000. This is a suitable time to request a substantial BIMA time allocation for solar work because solar brightness, due to the solar activity cycle, is at a minimum. BIMA’s field of view covers an entire active region. The array will be in a configuration containing both short and medium length baselines so that we can achieve a resolution of several arcseconds while simultaneously being sensitive to large sources (such as two footpoints 49° apart). Assuming solar activity levels characteristic of solar maximum, we can detect an average of 2 flares per day resulting in a database of 50-100 events, with up to half of these having simultaneous HESSI data. Flare event data will be calibrated and mapped and we will then make quick-look image cubes available via a web-accessible archive in a format (FITS) suitable for further analysis in IDL and compatible with SolarSoft standards. More detailed analysis of individual events can then be carried out in collaboration with outside observers interested in particular events.

Solar radio research at the University of Maryland is supported by NSF grants ATM 96-17378 and INT 98-19817 and NASA grants NAG 5-7870, NAG 5-6257 and NAG 5-7891. The use of BIMA for scientific research at the University of Maryland is supported by NSF grant AST 93-14847.

References


A High Resolution Decimetric Solar Radioheliograph


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2 - UFSM/CCNE/Dep. de Física, Santa Maria, RS; Brazil
3 - Indian Institute of Astrophysics (IIA), Bangalore, India
4 - Tata Institute of Fundamental Research, Pune Univ. Campus, Ganeshkhind, Pune, India
5 - Centro de Radio Astronomia e Aplicações Espaciais, SP, Brazil
6 - Universidade Federal de Sao Carlos - UFSCar, Dep. Computação, Sao Carlos, SP, Brazil

Abstract.

Brazilian Decimetric Array initially operating in the frequency range of 1.2 - 1.7 GHz is in the process of development. In the first phase, the radiotelescope will be a T-shaped array of 256 meter by 144 meter consisting of 29 parabolic antennas of four meter diameter with spatial resolution of about 3x4 min of arc. The heliograph will be located at Cachoeira Paulista having -22.7° latitude and -44.9° longitude. In phase II BDA will be working at protected radioastronomical bands of 20, 18, and 13 cm with a maximum baseline of 2500 m with typical spatial resolution of 18 x 24 arc seconds at 1.5 GHz with time resolution of 100ms. The status of the development, a brief description of the planned system and simulated solar images that will be obtained by the BDA are presented and compared with corresponding images of X-rays, obtained with the YOHKOH satellite. Even though images of solar active regions will be obtained at 1.5, 2.7 and 5.0 GHz for the first time, images of solar active regions at 10.7 cm will be observed by BDA, which are needed for investigations of solar terrestrial relationship. Multi-frequency solar imaging will enable modelling of prediction of ionosphere weather by using techniques of spectral tomography. In the phased array mode BDA can be used as a VLBI antenna of about 20 m diameter. Even in the limited galactic and extragalactic observations are also possible.

1. Introduction

There is a lack of a dedicated solar Radio-heliograph in the decimetric wavelength in the Southern Hemisphere. Here at INPE we have started developing Brazilian...
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5. Prospects During the HESSI Mission

It is planned to request a BIMA campaign for the period in the northern summer immediately following the planned launch of HESSI in July 2000. This is a suitable time to request a substantial BIMA time allocation for solar work because summer daytime observations of weaker celestial sources are usually problematic: BIMA’s field of view covers an entire active region. The array will be in a configuration containing both short and medium length baselines so that we can achieve a resolution of several arcseconds while simultaneously being sensitive to large sources (such as two footpoints 40" apart). Assuming solar activity levels characteristic of solar maximum, we could detect an average of 2 flares per day resulting in a database of 50–100 events, with up to half of these having simultaneous HESSI data. flare event data will be calibrated and mapped and we will then make quick–look image cubes available via a web-accessible archive in a format (FITS) suitable for further analysis in IDL and compatible with SolarSoft standards. More detailed analysis of individual events can then be carried out in collaboration with outside observers interested in particular events.

Solar radio research at the University of Maryland is supported by NSF grants ATM 96-12738 and INT 98-19107 and NASA grants NAG 5-7370, NAG 5-6257 and NAG 5-7901. The use of BIMA for scientific research at the University of Maryland is supported by NSF grant AST 93-14847.

References


High Energy Solar Physics: Anticipating HESSI

A High Resolution Decimetric Solar Radioheliograph

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Abstract.

Brazilian Decimetric Array initially operating in the frequency range of 1.2 - 1.7 GHz is in the process of development. In the first phase, the radioheliograph will be a T-shaped array of 256 meter by 144 meter consisting of 29 parabolic antennas of four meter diameter with spatial resolution of about 3 × 3 arcmin. The heliograph will be located at Cachoeira Paulista having a -22.7° latitude and -44.9° longitude. In phase II BDA will be working at protected radioastronomical bands of 20, 18, 13 and 6 cm with a maximum baseline of 2500 m with typical spatial resolution of 18 × 24 arc seconds at 1.5 GHz with temporal resolution of 100 ms. The status of the development, a brief description of the planned system and simulated solar images that will be obtained by the BDA are presented and compared with corresponding images of X-rays, obtained with the YOHKOH satellite. Even though images of solar active regions will be obtained at 1.5, 2.7 and 5.0 GHz for the first time, images of solar active regions at 10.7 cm will be observed by BDA, which are needed for investigations of solar terrestrial relationship. Multi-frequency solar imaging will enable modeling of prediction of space weather by using techniques of spectral tomography. The phased array mode BDA can be used as a VLBI antenna of about 20 m diameter. Even in the limited galactic and extragalactic observations are also possible.

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