Atmospheric Density Model for Decimetric Solar Bursts

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We show the physics parameters of the coronal density model for decimetric type III solar bursts. These are generated in both near the accelerated particles regions and the liberated energy to the flare region, particularly for impulsive phase.

The density classics models for solar decimetric burst for the low solar corona are not adequate for loops that emit solar flares type III in the decimetric band. It is difficult to determinate the velocity that trigger the mechanism for the solar type III flares, because the velocity depend critically of the density model used. Melendez (1997) used this same idea with the spectrometer PHOENIX (Swizerland), but those data are for low temporal resolution (100ms) and low spectral resolution, and the data the BBS are in height temporal (10ms) and height spectral resolution (5 MHz.)

We have analyzed dynamic spectra of decimetric bursts (200-2500 MHz) observed by the Brazilian Solar Spectroscope (BSS) from 1999 to 2001. We have used the images taken by the MDI and EIT instruments of the SOHO satellite. Currently we are developing an heliographic coordinates adjustment to identify the active regions where the solar bursts were produced, and we use this information for correct the frequency rate (df/dt) and the mean speed trigger on the solar radio decimetric bursts.

The solar coronal images the MDI and EIT instruments of the SOHO satellite are worked with the Interactive Data Language (IDL) and the SolarSoft. We development a algorithm just to do the determination the heliographic position the active regions that produced the solar bursts.

The data of the dynamic spectra of decimetric burst are analyzed used IRAF (Image Reduction Analysis Facility – National Optical Astronomy Observatory –NOAO, Tucson Arizona), and the BBSView software (development for the Sawant Solar Radio Physics group of the Instituto Nacional de Pesquisas Espaciais, INPE-Brazil).

The data are converting to format FITS and after we use the IRAF to determinate a frequency rate (df/dt) and search the initial frequency the solar bursts in the solar atmosphere. After we determinate the interval time (drift time) for each frequency between 200 and 2500 MHz for the solar bursts and finally we determinate the correlation between the frequency rate and initial frequency of the flare. Using Aschwanden and Benz relation (1995), we determinate the parameters of the expression of the coronal density model for decimeric type III solar bursts (power law), and the mean speed trigger corrected for the heliographic coordinate the solar bursts.

We show the results and conclusions of this work and the future plans of the our Peruvian Radio astronomy Group.