26.04

Millimeter Imaging of Energetic Electrons in Solar Flares in Conjunction with GRO Experiments

M. R. Kundu and S. M. White (Astr. Pgm, Univ. Md)

We propose to carry out observations of solar flares with a millimeter imaging telescope and a single dish millimeter patrol telescope, and analyze them in conjunction with gamma ray timing data and energy spectra to be obtained routinely by GRO. The millimeter observations will provide the ability to image the high-energy gamma-ray-producing electrons with high sensitivity, arcsecond spatial resolution and 0.3 second time resolution. By studying the imaging information together with GRO’s spectral information we will analyze the sizes and morphologies of the gamma-ray sources, study the properties of flares which emit gamma-rays, model the geometry of the electron acceleration region and place constraints on ion and electron acceleration mechanisms.

26.05

Acceleration and Transport of Solar Flare Associated Particles through a Joint Study of the Nancay Radioheliograph and GRO Observations

N. Vilmer (Obs. de Paris, Meudon)

26.06

Observations of Linear Hα Polarization in Flares

T. R. Metcalf, J. P. Wüser, and R. C. Canfield (UH-IPA)

We present the temporal, spatial, and spectral development of linear Hα polarization during an M1.8 solar flare on March 20, 1990, observed with the Haleakula Stokes Polarimeter at Maesh Solar Observatory, Haleakula, Hawaii (D. L. Mickey, Solar Phys., 97, 223, 1985). Linear Hα polarization has been interpreted as impact polarization from hectar-keV protons streaming into the chromosphere and hence may give a diagnostic of the presence of these protons (J. C. Hénoux et. al., Ap. J. Supp., 73, 303, 1990). This observation is part of an ongoing study focusing on the relative timing between Hα polarization and other flare emissions (e.g. hard X-rays), on the wavelength dependence of this polarization, and on the degree of polarization as a function of heliocentric angle. The initial goal of this study is to verify that the observed polarization is indeed impact polarization.

26.07

The MSFC Solar GRO Guest Investigation


The proposal "Investigation of Nonpotential Magnetic Fields at Sites of Gamma-Ray Flares" was selected as part of the Gamma Ray Observatory Guest Investigator program. In this paper we will describe the research goals of this investigation that will use observations of the photospheric magnetic field in active regions obtained with the MSFC vector magnetograph. These observational data will be used to determine locations where the field is strongly nonpotential and to correlate nonpotential characteristics with the production of gamma-ray flares detected by experiments on GRO.

Session 27: GRO Guest Investigations II

Chair: Brian Dennis
3:00–4:30 pm, Salon A

27.01

Stereoscopic Observations of Solar Flare X-Ray and Gamma-Ray Sources Using GRO Instruments

S.R. Kane, K. Hurley (UC Berkeley), J. Laros (LANL), and M. Schinner (MPE Garching)

We propose a correlated study of the hard X-ray and gamma-ray continuum (HXRGR) emissions from solar flares observed simultaneously with the Burst and Transient Source Experiment (BATSE) on the Gamma Ray Observatory (GRO) and comparable instruments aboard the Pioneer Venus Orbiter (PVO) and Ulysses spacecraft. PVO has been in operation since 1978 and is expected to continue in operation through the years of solar activity maximum 1990-1992 during which time both GRO and Ulysses will also be operating. It is, therefore, expected that the combined data set will contain a large number of "common" flares for which a statistically significant photon flux is observed simultaneously by GRO and PVO and/or Ulysses.

27.02

Automated Search for Solar Microflares on the Burst and Transient Source Experiment

D. A. Biesecker (U. New Hampshire)

The launch of the Burst and Transient Source Experiment (BATSE) on the Gamma Ray Observatory will allow for the first long term study of solar microflares. With years of BATSE observations one can expect to build a large database of microflare events. This database will allow us to estimate the size distribution and frequency of events which can then be used to determine if microflares are an important mechanism for energy and particle transport on the sun.

The Solar Maximum Mission's (SMM) Hard X-Ray Burst Spectrometer observed over 2,500 solar and nonsolar events in the 12 month period beginning one year after the 1979 Solar Maximum. With BATSE's large effective area we expect a larger number of events in the first year of operation. A computer algorithm has been developed to search for solar photon events in the BATSE Large Area Detector 1.024s data set. This algorithm is being tested by searching for transient events in the SMM Gamma Ray Spectrometer's (GRS) X-Ray detectors. The results will be compared with those of earlier visual and automated search routines.

We report the test results for the algorithm described above. Also, the initial investigation plan and the goals of the microflare study are outlined.

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