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ABSTRACTS OF PAPERS PRESENTED AT THE SECOND MEXICO–TEXAS CONFERENCE ON ASTROPHYSICS, STAR FORMING REGIONS AND IONIZED GAS

EXPANSION OF A MAGNETIC ARCADE DURING A SOLAR FLARE

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The dynamics of a magnetic arcade typical of an active region in the solar atmosphere is studied when it is affected by a solar flare occurring somewhere within the enclosure of the arcade. As it expands in the Corona propelled by the increased flare pressure, the energetic flare accelerated particles that are trapped by the field are carried along and can only escape if an appropriate instability is excited. We study a pressure-driven instability of the ballooning-mode type as a releasing mechanism. This is excited as the plasma β exceeds a critical value shortly after the flare onset, and grows in times of the order of one second. The arcade can continue evolving with an approximately constant speed since this mode is quickly stabilized and the remaining particles and plasma stay trapped until another mechanism "opens"the bottle. The possible excitation of a Rayleigh-Taylor instability which has been proposed as a process for releasing energetic particles is also analyzed. Under the prevailing conditions it is found to be unlikely to occur, for the stabilizing effect of the magnetic field is large enough to slow the growth down to values longer than an hour. A second release of particles may come later in the expansion, as a result of a magnetic reconnection of the arcade lines, with opposite polarity open lines that are overtaken in the upper Corona. Time scales for this process to develop in the low collisionality plasma are given. This is found to be an extremely fast process due to the strong compression of the neutral sheet by the expanding field. Trapped particles will be released within 10-20 minutes after the flare onset. The effect of a shock wave moving in front of the expanding bottle, on the number of particles injected into interplanetary space, is also discussed.

NEAR–INFRARED AND OPTICAL IMAGES OF THE STAR FORMING REGION GM-24

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Images at *J*, *H*, *K*, *L*, Br_γ and H_2 of the star forming region GM-24 are presented, together with Hα, *R* and *I*–band CCD images. All images were obtained at CTIO with the 1.5 and 0.9-m telescopes. Astrometry of one very blue star in the region has allowed us to establish an accurate correlation between visible, infrared and radio features. Our images show the presence of a highly obscured infrared cluster of very young massive stars, of a compact H II region (previously mapped at radio wavelengths), and of warm dust. We present a luminosity function for the region based on preliminary infrared spectral classification and determination of the extinction for each star. The radio H II region is coincident with the diffuse near–infrared and optical features. Our images show that the compact H II region is excited by a single massive star, a fact already noticed in radio observations, while other stars of comparable mass present in the region have not developed ionized regions. A complete description of observations and results will be published in the near future.

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