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Title:Unusual Emissions at Various Energies Prior to the Impulsive Phase of the Large Solar Flare and Coronal Mass Ejection of 4 November 2003
Authors:Kaufmann, P. (1); Holman, G.D. (2); Su, Y. (2); de Castro, C.G.G. (1); Correia, E. (1); Fernandes, L.O.T. (1); de Souza, R.V. (1); Marun, A. (3); Pereyra, P. (3)
Author affiliation:(1) Univ Presbiteriana Mackenzie, Escola Engn, CRAAM, BR-01302970 Sao Paulo, Brazil; (2) Catholic Univ Amer, Dept Phys, Washington, DC 20064 USA; (3) Consejo Nacl Invest Cient & Tecn, San Juan, Argentina
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Abstract:The GOES X28 flare of 4 November 2003 was the largest ever recorded in its class. It produced the first evidence for two spectrally separated emission components, one at microwaves and the other in the THz range of frequencies. We analyzed the pre-flare phase of this large flare, twenty minutes before the onset of the major impulsive burst. This period is characterized by unusual activity in X-rays, sub-THz frequencies, H alpha, and microwaves. The CME onset occurred before the onset of the large burst by about 6 min. It was preceded by pulsations of 3 -aEuro parts per thousand 5 s periods at sub-THz frequencies together with X-ray and microwave enhancements. The sub-THz pulsations faded out as impulsive bursts were detected at 100 -aEuro parts per thousand 300 keV and 7 GHz, close to the time of the first H alpha brightening and the CME onset. The activities detected prior to and at the CME onset were located nearly 2 arcmin south of the following large flare, suggesting they were separate events. This unusual activity brings new clues to understanding the complex energy buildup mechanisms prior to the CME onset, occurring at a distinct location and well before the major flare that exploded afterwards.
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