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The increasing submillimeter spectral component of intense solar flares

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The flare on November 2nd, 2003, at 17:17 UT, occurred on the very active region 486 located at S14W56. This flare, classified as a X8.3 and 2B event, is one of the few events detected simultaneously by RHESSI and the Solar Submillimeter Telescope (SST) at 212 and 405 GHz. The centroid position of the submm radiation is compared to the X-rays sources, as well as the time profiles at different energy bands. The main feature of this flare is that its submm spectra are distinct from the usual microwave spectra, showing an increase with frequency. Several possibilities to explain this second spectral component with increasing radio spectra are discussed, such as free-free emission, synchrotron emission from the positrons produced by the interactions of accelerated particles in this flare, and gyrosynchrotron radiation from accelerated electrons.

Publication:


Cosmic Particle Acceleration, 26th meeting of the IAU, Joint Discussion 1, 16-17 August, 2006, Prague, Czech Republic, JD01, id.25

Pub Date:

August 2006

Bibcode:

2006IAUJD...1E..25S

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