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Long duration gamma-ray solar emission during march, 7-8th, 2011 observed by Fermi

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We report on Fermi Large Area Telescope (LAT) detection of long-lived gamma-ray emission from the Sun during 2011 March 7 to 8.

At 19:43 UT on 7 March 2011, GOES X-ray monitor observed the onset of M3.7 solar flare. Following the flare, gamma-rays above 100 MeV was detected by Fermi/LAT with high significance. The flux was at least higher than the Vela pulsar, which is the brightest steady source in the gamma-ray band.

The gamma-ray emission lasted at least 9 hours, and the spectrum ($E > 100$ MeV) accumulated during the flare duration was relatively soft. Rhesi and Fermi/GBM did not detect such a long-lasting hard X-ray emission during the LAT detection.

Considering the lack of hard X-ray emission, decay of pions produced by accelerated protons would be responsible for the LAT emission.

We discuss these possible emission mechanisms.

Summary

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