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Properties of Coronal Mass Ejection and Type II Solar Radio Burst Associated with Sustained >100 MeV Gamma-ray Emission Event Observed by FERMI/LAT

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Sustained gamma-ray emission (SGRE) events observed by FERMI/LAT at >100 MeV energies are associated with fast and wide coronal mass ejections (CMEs) from the Sun. These CMEs are similar to those that cause ground level enhancement in solar energetic particle (SEP) events. CME-driven shocks have been suggested to be the acceleration site of the >300 MeV protons producing the >100 MeV gamma-ray emissions. Correlation between the durations of SGRE events and type II solar radio bursts that are produced by shock-accelerated electrons support the idea. We discuss the CME and type II radio burst properties associated with the SGRE event observed on 7 June 2011. The near-Sun peak speed of the CME was 1680 km/s and it accelerated relatively fast. It produced an SEP event with a fluence spectral index of 2.22±0.22 and it was associated with a GOES M2.5 X-ray flare. At the end time of type II radio burst, the shock had traveled to a radial distance of 75.5 R_{sun} and had a speed of about 1000 km/s. The estimated durations of the SGRE and type II radio burst were 3.08±1.67 hr and 10.93±0.32 hr, respectively. We discuss briefly also the limitations the gamma-ray, CME and radio observations.

Track

Solar System

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