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Ion acceleration and neutral emission mechanisms for 2005 September 7 flare

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Abstract content

In association with an X17.0 flare on 2005 September 7, strong neutral emissions were detected both in space and on the ground. In space, intense emissions of gamma-rays were registered by INTEGRAL and by RHESSI during the decay phase. Gamma-ray lines at 0.511, 2.2, 4.4, and 6.1 MeV were observed and there was evidence for pion-decay radiation. On the ground, relativistic neutrons were observed by the neutron monitors at Mt. Chacaltaya and Mexico City and by the solar neutron telescopes at Chacaltaya and Mt. Sierra Negra. The neutron signal continued for more than 20 minutes with high statistical significance. The long decay of the signals suggests that ions were continuously accelerated or trapped in the emission site. We also find that gamma-rays were emitted over a corresponding extended period. Only when we cooperate the high-energy gamma-ray emission time history can we explain the long-lasting neutron emission. We also use the Hua et al. (2002) solar-flare magnetic loop transport and interaction model to find the best model to explain the data.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 1 (SH), pages 45-48

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