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THE GAMMA-RAY MOON SEEN BY THE FERMI LAT

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When seen in gamma rays, the Moon appears brighter than the Sun. Gamma rays emitted by the Moon mostly originate from the decays of neutral pions produced by the interactions of cosmic rays with the lunar surface. Using the data collected by the Fermi LAT in its first seven years of operation, we measured the gamma-ray emission spectrum of the Moon in the energy range from 30 MeV up to a few GeV and we studied its time evolution, finding a correlation with the solar activity. We also developed a full Monte Carlo simulation based on the FLUKA code, which describes the production of gamma rays in the cosmic-ray interactions with the Moon. We used the simulation results to infer the cosmic-ray proton and helium spectra near the Earth from the lunar gamma-ray data.

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