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Fermi Large Area Telescope Observations of the gamma-ray emission from the Quiescent Sun

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The high energy gamma-ray emission from the Sun is due to the interactions of cosmic ray (CR) protons and electrons with matter and photons in the solar environment. Such interactions lead to two component gamma-ray emission: a disk-like emission due to the nuclear interactions of CR protons and nuclei in the solar atmosphere and a space extended emission due to the inverse Compton (IC) scattering of CR electrons off solar photons in the whole heliosphere. The observation of these two solar emission components may give useful information about the evolution of the solar cycle by probing two different CR components (proton and electrons) in regions not directly accessible by direct observations. We present the results of the observations of the Sun with Fermi-LAT in the first 7 years on orbit, with the exception of the flaring periods. Significantly large photon statistics and improved processing performance allow us to explore both components of the emission in greater details and perform better comparisons of data with current models of the IC component. This allows us to probe CR electrons in the inner heliosphere which is not possible by other methods. Moreover, the longer period of observations allows us to study the variations of the emission between the maximum and the minimum of the solar cycle.

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