

Peculiar High-Energy Gamma Rays from the Sun

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The Sun has long been expected to be a steady gamma-ray and neutrino ($> \text{GeV}$) source due to constant bombardment by cosmic rays. I will discuss recent progress in studies of these solar atmospheric gamma rays with the Fermi Space Gamma-ray Telescope, and the prospects of the detecting the Sun with high-energy neutrinos. Surprisingly, the gamma-ray flux was found to be higher than the previous prediction by almost a factor of 10 and displays rich and surprising features such as large time variation, hard spectrum, strange spectral features, and morphological changes. Understandings of these gamma rays could lead to a new probe of the deep layers of the solar atmosphere and cosmic-ray propagation in the solar system. Near-future TeV gamma-ray (HAWC, LHAASO) and neutrino (IceCube, KM3NeT) observations could provide additional insights to the problem, and have interesting implications for dark matter searches with the Sun.

Primary author: NG, Kenny Chun Yu (GRAPPA, University of Amsterdam)

Presenter: NG, Kenny Chun Yu (GRAPPA, University of Amsterdam)

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