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Evidence for quasi-periodic modulation in the gamma-ray blazar PG 1553+113

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For the first time a gamma-ray and multiwavelength nearly-periodic oscillation in an active galactic nucleus is reported using the Fermi Large Area Telescope (LAT). A quasi-periodicity in the gamma-ray flux ($E > 100$ MeV and $E > 1$ GeV) is observed from the well-known GeV/TeV BL Lac object PG 1553+113 (Ackermann et al. submitted). The significance of the 2.18 ± 0.08 year-period gamma-ray modulation, seen in 3.5 oscillation maxima observed, is supported by significant cross-correlated variations observed in radio and optical flux light curves, through data collected in the OVRO, Tuorla, KAIT, and CSS monitoring programs and Swift UVOT. The optical cycle, appearing in about 10 years of data, has a similar period, while the radio-band oscillation observed at 15 GHz is less regular and coherent. The available X-ray flux data obtained by Swift XRT appears also to be linearly correlated with the gamma-ray flux. Further long-term multi-wavelength monitoring of this blazar may discriminate among the possible explanations for this first evidence of periodicity. In this view a multi-wavelength campaign, from radio to VHE gamma rays was started in 2015 (Hughes et al. this conference).

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