

From light curves to power spectra: unveiling time-domain behavior with gammapy

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Gamma-ray astrophysics increasingly focuses on time-domain studies of variable sources like GRBs and AGNs. As the foundation for CTAO's science analysis tools, the open Python analysis library Gammapy must adapt to support these advancements. This contribution highlights the recent expansion of Gammapy's time-domain capabilities and outlines its near-future plans, particularly regarding power spectrum analysis in Fourier space. Estimating the spectral behavior of a light curve in the frequency domain is crucial for studying variable astrophysical sources. We present Gammapy's novel framework for simulating light curves from a power spectrum model using the Timmer & Koenig and Emmanoulopoulos algorithms. This framework includes a fitting recipe to assess the behavior of observed light curves in the frequency domain. We will also demonstrate the expected reconstruction power of CTAO using this method under various observational scenarios.

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