Contribution ID: **385** Type: **Contributed e-poster**

Quasi-periodic oscillations in the gamma-ray light curves of bright active galactic nuclei

The detection of quasi-periodic oscillations (QPOs) in the light curves of active galactic nuclei (AGNs) can provide insights on the physics of the super-massive black-holes (SMBHs) that power these systems, and could represent a signature of the existence of SMBH binaries, setting fundamental constraints on SMBH evolution through the Universe. The identification of long term QPOs, with periods of the order of months to years, is particularly challenging and can only be achieved via all-sky monitoring instruments that can provide unbiased, continuous light-curves of astrophysical objects. The Fermi-LAT satellite, thanks to its monitoring observing strategy, is an ideal instrument to reach such a goal. We aim to identify QPOs in the γ-ray light-curves of the thirty-five brightest AGNs within the Fermi-LAT catalog, including data from the beginning of the Fermi mission (August 2008) to April 2020, and energies from 100 MeV to 300 GeV. Two time binnings are investigated, 7 and 30 days. The search for quasi-periodic features is then performed using the continuous wavelet transform. The significance of the result is tested via Monte Carlo simulations of artificial light curves with the same power spectral density and probability distribution function as the original light curves. We identify thirty quasars with candidate QPOs, confirming several candidates discussed in the literature: PKS 2247-131, B2 1520+31, PKS 0426-380, PKS 0537-441, S5 0716+714, Mrk 421, PKS 1424-418, PG 1553+113, Mrk 501 and PKS 2155-304. The most significant QPO ($> 4\sigma$ in the global wavelet spectrum, with a period of 1134 $\pm$ 226 days) is observed in the quasar S51044+71, and is reported here for the first time.

Primary authors: REN, Helena (MPIK); CERRUTI, Matteo (Institut de Ciències del Cosmos (ICCUB), Universitat de Barcelona (IEEC-UB), Martí i Franquès 1, 8 E08028 Barcelona, Spain); SAHAKYAN, Narek (ICRANet-Armenia, Marshall Baghramian Avenue 24a, Yerevan 0019, Armenia)

Presenter: REN, Helena (MPIK)

Session Classification: Contributed posters