Locating the gamma-ray emission regions in the relativistic jet of 3C 279.

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We present an analysis of the optical and GeV gamma-ray behaviour of the flat-spectrum radio quasar 3C 279 during four phases of significant gamma-ray flux variability between 2014 –2019. Multiple flares were observed during this period, with the most rapid flare exhibiting a flux doubling time of 2.66 hr. A ZDCF analysis of the optical and gamma-rays light curves show a near-zero time-lag during flares, while a consideration of the photon-photon opacity places a constraint on the minimum Doppler factors ($\delta > 10.0$). Spectral analysis shows the gamma-ray SEDs are well described by a broken-power law during the flare phases, with a spectral break energy between 0.7 - 2.0 GeV. From the spectral behaviour and temporal variability, we infer that the optical and gamma-ray emission during all the flares is produced at a similar location in the jet, which is situated on the outer boundary of the BLR.

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