

Characterizing the brightest gamma-ray flares of flat spectrum radio quasars

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Abstract content

Almost 10 years of observations with the Fermi Large Area Telescope (LAT) have revealed extreme gamma-ray outbursts from flat spectrum radio quasars (FSRQs), temporarily making these objects the brightest gamma-ray emitters in sky. Yet, the location and mechanisms of the gamma-ray emission remain elusive. Here, we characterize the brightest flares of six FSRQs observed with the LAT. We find evidence for variability on timescales as short as minutes in all but one source, which suggests that extremely compact emission regions located at large distances from the central black hole are a common feature in FSRQs. We do not find any signs for gamma-ray absorption in the broad line region, which further further indicates that the gamma rays are produced away from the black hole by hundreds of gravitational radii. The gamma-ray light curves of these sources on different temporal scales provide us with a rich data set that can be compared to theoretical models of emission and particle cooling scenarios.

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