Fermi LAT observation of exceptionally bright gamma-ray outbursts from 3C 454.3 in 2009 December and 2010 April

Y. T. Tanaka[1], L. Escande[2], B. Lott[2] and C. D. Dermer[3], on behalf of Fermi/LAT collaboration

[1] ISAS/JAXA
[2] CNRS
[3] NRL
E-mail(TY): tanaka@astro.isas.jaxa.jp

Abstract

We report on Fermi/LAT observation of exceptionally bright gamma-ray outbursts from 3C 454.3 in December 2009 and April 2010. The 2009 December outburst from 3C 454.3 was extraordinary. Namely, its daily gamma-ray flux reached the highest flux of any blazar ever recorded, and 3C 454.3 became the brightest gamma-ray source in the sky for over 1 week. In April 2010, 3C 454.3 again emitted a bright outburst. Triggered by this outburst, Fermi performed a pointed-mode observation toward 3C 454.3 for 200 ksec. Although the gamma-ray fluxes changed by an order of magnitude during the two outbursts, its spectra which were represented by broken power-law did not show significant time evolution: The spectral indicies and break energy were nearly the same as those in quiescence. Furthermore, no clear loop patterns were seen in the gamma-ray spectral index versus the flux plane as would be expected in acceleration and cooling scenarios. In this presentation, we focus on the light curve and spectrum in gamma-ray band observed by Fermi/LAT, and discuss physical mechanism of gamma-ray emission and jet structure.