

Reconstruction of the characteristics of a high-energy event detected by the Carpet-2 array in association with the GRB 221009A gamma-ray burst

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The Carpet-2 collaboration reports on the observation and analysis of an event with a low muon content coincident with the gamma-ray burst GRB 221009A and the transient Swift J1913.1+1946. This bright transient was observed by numerous instruments in the optical, X-ray and gamma-ray energy ranges. The redshift of this GRB is $z=0.1505$ (measured from afterglow observations).

The Carpet-2 array detected an extensive air shower at 14:32:35 UT (1338 s after the SWIFT trigger and 4536 s after the GBM trigger) with the reconstructed arrival direction (RA=289.51°, Dec=18.44°), which is 1.78° from the direction towards GRB 221009A, well within the angular resolution of Carpet-2 (approx 4.7°). This event produced zero hits in the 175 m² muon detector of the Carpet-2 array. The reconstructed energy of the primary particle is in the range of 200-250 TeV. We estimate of the probability of the type of particle (photon or proton), its energy and detection efficiency.

Primary author: KARPIKOV, Ivan (INR RAS)

Co-author: CARPET-2 COLLABORATION

Presenter: KARPIKOV, Ivan (INR RAS)

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