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Jitter Mechanism as a Kind of Coherent Radiation: GRB 221009A beyond 10 TeV

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The emission of GRB 221009A beyond 10 TeV has been detected by LHAASO. We suggest jitter radiation as a possible explanation for the TeV emission of this energetic GRB. We first present a short review on both synchrotron mechanism and jitter mechanism. We then present the kinetic turbulence that can work on the small length scale. In our scenario, the jitter radiation field is linked to the perturbation field, and the perturbation field is dominated by the kinetic turbulence. The jitter radiation can reach the TeV energy band when we consider either electron cooling or Landau damping. We further suggest that the jitter radiation in the very high-energy band is coherent, and the observational flux of GRB 221009A in the TeV energy band can be reproduced by the the coherent jitter mechanism. In addition, the coherent jitter radiation is expected to have wide applications in the high-energy astrophysical research field.

Summary

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