

The implications of TeV detected GRB afterglows for acceleration at relativistic shocks

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We revisit the external shock picture of gamma-ray burst afterglow models, in light of recent very-high-energy gamma-ray detection from GRB190829A. The maximum electron energy achievable at an ultra-relativistic weakly-magnetized shock is thought to proceed in the “ballistic” transport regime. This limits synchrotron photons to energies below the often assumed burn-off limit. A single zone synchrotron/SSC model is developed to compare the revised afterglow predictions against multi-wavelength data of GRB190829A. Reproducing the hard spectrum reported by H.E.S.S. collaboration within our simple single zone model is a serious challenge when Klein-Nishina effects are correctly accounted for.

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