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Dynamics of relativistic jet formation: case study of GRB 090510

We employ General Relativistic Magnetohydrodynamic (GRMHD) simulations to investigate the properties of GRB 090510, a short gamma-ray burst detected by Fermi-LAT. This study aims to quantify key parameters such as jet opening angles, energetics, Lorentz factors, and jet structures, alongside the progenitor details of the compact binary. Additionally, we perform a suite of models to study short GRB jet dynamics in general. Our results align closely with observations, validating our simulation methodology. This alignment enhances our theoretical models, improving their fidelity in replicating observed phenomena.

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