

Gamma-Ray Bursts and Afterglow

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The origin of GRBs have been a mystery for almost 30 years. Their sources emit huge amount of energy on short time scales and the emission involve extreme relativistic motion with bulk Lorentz factor of at least few hundred. In the last two year, X-ray, optical, IR, and radio afterglow was detected, lasting up to months and even years after the GRB. We review the theory for the γ -rays emission and the afterglow and show that these are well supported by the observations. A recent detection of prompt optical emission, during the GRB event of January 23rd, well agrees with theoretical predictions and farther constrain the free parameters of the models. We discuss the evidence that some of these bursts are beamed, and show that future polarization measurement could provide unique tests to that picture.