



Contribution ID: 1077

Type: Invited talk in the parallel session

Examining 2D Luminosity-Time Correlations for Gamma Ray Burst Radio Afterglows

Tuesday, July 6, 2021 8:30 AM (20 minutes)

Gamma-Ray Burst (GRB) afterglow emission can be observed from sub-TeV energies to radio wavelengths, though radio afterglows are less common. We examine GRB radio light curves to look for the presence of radio plateaus, resembling the plateaus observed in X-ray and optical light curves. We analyze all published GRBs with observed radio afterglow and fit 64 radio light curves with the broken power law model, finding 16 GRBs that present a radio plateau. For these 16 GRBs, we compare the rest-frame end time for the radio plateaus (T_{radio}) with plateaus in X-ray and optical wavelengths (T_{X} , T_{opt}) and conclude that T_{radio} occurs much later than T_{X} and T_{opt} (Dainotti et al. 2013, Dainotti et al. 2020). We examine the two-dimensional correlation between T_{radio} and the radio luminosity at the end of the plateau, and determine that though the correlation exists, it does not resemble this correlation in X-ray and optical wavelengths. We also consider also the two-dimensional correlation between the jet opening angle, θ_j , and T_{radio} .

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Session Classification: Gamma-Ray Burst Correlations: Observational Challenges and Theoretical Interpretation

Track Classification: Fast Transients: Gamma-Ray Burst Correlations: Observational Challenges and Theoretical Interpretation