

## Celebrating 20 years of Swift Discoveries



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# Lessons from the Swift XRT GRB sample: from scale-invariance to light curve flux spread and from plateau correlations to reverse shock properties

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A large and growing sample of Swift XRT observations allows us to draw conclusions about the population properties of GRBs. I will present two examples of this. One builds on the scale-free nature of GRB afterglow dynamics and synchrotron spectra, deploying scale-invariance to interpret the spread of observed fluxes when binned by light-curve slope at the time of observation. This spread is found to increase with increasing light-curve slope. According to the scaling relations, this pattern is inconsistent with a large spread in environment densities if these were the dominant factor determining the variability of light curves. The other, earlier published, example uses the known correlations between afterglow plateau end times and flux levels, both in X-rays and optical, to show that GRB plateaus are consistent with the “thick shell” model but not with “thin shell” models for reverse shocks.

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