

Abstract Submitted
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The Needle in the 100 deg² Haystack: From Fermi GRBs to LIGO Discoveries with the Palomar Transient Factory LEO SINGER, NASA/GSFC
— The Fermi satellite has greatly expanded the sample and energy window of gamma-ray bursts (GRBs), but the 10-100 deg² localizations from the onboard Gamma-ray Burst Monitor (GBM) have posed a formidable obstacle to locating their multiwavelength afterglows with narrow-field instruments. Wide-field, time-domain optical surveys are the key. We present the results of one year of target-of-opportunity searches with the intermediate Palomar Transient Factory (iPTF): the first eight afterglow discoveries based solely on Fermi GBM localizations. Two (GRBs 130702A and 140606B) were at low redshift ($z = 0.145$ and 0.384 respectively) and had spectroscopically confirmed broad-line type Ic supernovae. Two are possibly consistent with mildly relativistic shocks breaking out from the progenitor stars, rather than the ultra-relativistic internal shock mechanism that powers standard cosmological bursts. Now that such targeted optical searches are becoming routine, we discuss our preparations to search for optical counterparts of binary neutron star mergers that should soon be detected by Advanced LIGO, scheduled to begin science operations in late 2015. We discuss the future of multimessenger observations with subsequent optical surveys, including the Zwicky Transient Facility (ZTF).

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