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Searching for Short GRBs in Soft Gamma Rays with INTEGRAL/PICsIT ()

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With gravitational wave (GW) detections by the LIGO/Virgo collaboration over the past several years, there is heightened interest in gamma-ray bursts (GRBs), especially “short” GRBs ($T_{90} < 2\text{s}$). The high-energy PICsIT detector ($\sim 0.2 - 10$ MeV) on-board the INTErnational Gamma-Ray Astrophysics Laboratory (INTEGRAL) is able to observe sources out to approximately 70° off-axis, making it essentially a soft gamma-ray, all-sky monitor for impulsive events, such as SGRBs. Because SGRBs typically have hard spectra with peak energies of a few hundred keV, PICsIT with its ~ 3000 cm² collecting area is able to provide spectral information about these sources at soft gamma-ray energies. We have begun a study of PICsIT data for faint SGRBs similar to the one associated with the binary neutron star (BNS) merger GW 170817, and also are preparing for future GW triggers by developing a real-time burst analysis for PICsIT. Searching the PICsIT data for significant excesses during ~ 30 min-long pointings containing times of SGRBs, we have been able to differentiate between SGRBs and spurious events. Also, this work allows us to assess what fraction of reported SGRBs have been

detected by PICsIT, which can be used to provide an estimate of the number of GW BNS events seen by PICsIT during the next LIGO/Virgo observing run starting in Fall 2018.

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