

# Strong Lensing of Confined Magnetar Burst Fireballs

Fermi GBM has a catalog of many hundreds of magnetar bursts. These bursts are short in duration, quasi-thermal in spectrum and exhibit complex spectro-temporal behavior suggestive of Comptonized fireballs. Recent report of rotational-phase selection of magnetar short bursts in SGR 1830-0645 and SGR 1935+2154 strongly suggest a fixed and low altitude emission locale for magnetic flux tubes which confine the Comptonized fireball during magnetar bursts. At such low altitudes, gravitational lensing can be important and a second lensed image can result for bursts behind the neutron star for the observer. This lensing can imprint not only flux changes, but time delays and temporal-spectropolarimetric variation of bursts at particular rotational phases. For fixed active regions and flux tubes, X-ray and gamma-ray instruments with high temporal resolution (such as Fermi-GBM, NICER, STROBE-X, eXTP, and AMEGO-X) could enable constraints of the compactness and radius of magnetars via spectral, timing, and polarization of bright bursts which occur behind the star for observers. I detail general relativistic ray traced models of such bursts and observable signatures.

## Track

Pulsars

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