

## Magnetar giant flare in NGC 253 seen by Fermi-GBM



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- Magnetar giant flares (MGFs) are enormous eruptions likely triggered by surface disruptions in magnetars, neutron stars with the strongest-known magnetic fields. Such events can be detected in both X- and gamma-ray bands, but are very rare.
- Here we report the **observation and analysis of GRB 200415A**, a very short and bright Gamma-Ray Burst detected by the Fermi Gamma-Ray Burst Monitor (GBM) as well as by several other instruments participating in the InterPlanetary Network (IPN) system, which located it in a region spatially coincident with the **nearby galaxy NGC 253**.
- Analysis of the event revealed **peculiar spectral and temporal properties**, which are not typically seen in GRBs:
  - A **very short rise time** of the initial hard spike;
  - **Strong submillisecond variability**;
  - A **flat spectrum**;
  - An unusually **low isotropic energy release**;
  - A **mild hint of periodicity** in the event's tail was also detected.
- Therefore we concluded that GRB 200415A is not a classical short GRB due to the merger of two binary neutron stars, but rather a **MGF produced by an extragalactic magnetar**.