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Gamma-ray bursts and magnetars: observational signatures and predictions in the multimessenger era

Newly-born millisecond magnetars are competing with black holes as source of the gamma-ray burst (GRB) power, mainly with their rotational energy reservoir. In ten years of activity, Swift has provided compelling observational evidences supporting the magnetar central engine, as the presence of a plateau phase in the X-ray light curve, the extended emission in SGRBs and the precursor and flaring activity. We review the major observational evidences for the possible presence of a newly-born magnetar as the central engine for both long and short GRBs. We then discuss about the possibility that all GRBs are powered by magnetars, and we propose a unification scheme that accommodates both magnetars and black holes, connected to the different properties and energetics of GRBs. Since the central engine remains hidden from direct electromagnetic observations, we discuss the observational perspectives for GRB powered by magnetars in the multi messenger era.

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