

Title

Investigating the magnetar/FRB link via multi-band follow-up of magnetar outbursts with MeerKAT and Einstein Probe

Abstract

The since long proposed model of a connection among the class of the magnetars and at least a subgroup of the Fast Radio Bursts (FRBs) obtained a strong support with the remarkable observation of two ultra strong millisecond duration radio pulses temporally coincident with a double-peaked hard X-ray burst from the magnetar SGR 1935+2154.

However, our current statistics about the magnetars which showed FRB-like (2 cases) or pulsed (6 cases) radio emission is very limited and we know only 2 cases of ordinary radio pulsars manifesting magnetar-like features. Moreover, only for about half of those objects, does there exist simultaneous X-ray/radio observations and in most cases a significant gap occurred between the date of the X-ray outburst and the first contemporaneous X-ray/radio follow-up.

Given that, we are planning a series of "simultaneous" observations in the radio and X-ray bands of both magnetars and ordinary pulsars showing a magnetar-like behavior, with the immediate goal to systematically search for coincident X-ray and radio bursts and characterize their energetic, spectral and temporal properties, and their light curve morphology. Besides investigating the link among magnetars and FRBs, this program will shed light on the radio emission mechanism(s) operating in at least a subset of the magnetar population, and the occurrence (if any) of an evolutionary path connecting the magnetars to the ordinary radio pulsars.

The trigger will be suitable X-ray observations allocated after the occurrence of an activation (or reactivation) in the high energy bands of the neutron star underlying the targets.