



# Observing Application

Date : Aug, 25 2008  
 Proposal ID : VLA/08C-231  
 Legacy ID : AG804  
 PI : Joseph Gelfand  
 Type : Rapid Response - Target of Opportunity  
 Category : Galactic  
 Total Time : 6.0

## The Origin of the Radio Emission from Flaring Magnetar SGR 0501+4516

### Abstract:

On 2008 August 25, radio emission was discovered from SGR 0501+4516 after an intermediate burst - not a giant flare like that observed on 2004 December 27. Initial observations of this radio source suggest that, like the 2004 December 27 giant flare, this radio emission is powered by material ejected from the neutron star during this burst. To determine if this interpretation is correct, we request two 3-hour observations of SGR 0501+4516 spaced 2-3 days apart to measure its broadband radio light curve and spectrum. As we demonstrated for the 2004 December 27 giant flare, this information will allow us to definitely determine if the radio emission is powered by neutron star ejecta and, if so, measure its initial energy and mass. This provides a direct test of the magnetar model, which requires that the ejecta energy be substantially less than the radiative energy of such a burst. This radio source is the the first to be detected from a magnetar after an intermediate burst, and thus offers an unique opportunity to study the physical properties of this rare class of neutron stars.

### Authors:

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### Related proposals:

### Joint:

Not a Joint Proposal

### Observing type(s):

Continuum

### VLA Resources

Name	Conf.	Frontend & Backend	Setup
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Name	Conf.	Frontend & Backend	Setup
6cm	Any	C Band 6 cm 4200-7700 MHz VLA Correlator - Single Channel Continuum	Rest frequencies: 4885.1,4835.1 MHz Bandwidth: 50 MHz
20cm	Any	L Band 20 cm 1000 - 2000 MHz VLA Correlator - Single Channel Continuum	Rest frequencies: 1464.9,1385.1 MHz Bandwidth: 50 MHz
3.6cm	Any	X Band 3.6 cm 8080 - 8750 MHz VLA Correlator - Single Channel Continuum	Rest frequencies: 8435.1,8485.1 MHz Bandwidth: 50 MHz
1.3 cm	Any	K Band 1.3 cm 18000 - 26500 MHz VLA Correlator - Single Channel Continuum	Rest frequencies: 22485.1,22435.1 MHz Bandwidth: 50 MHz

### Sources:

Name	RA / RA Range	Dec / Dec Range	Epoch	Velocity / z	Group
SGR	05:01:06.7 00:00:00.0	+45:16:34 00:00:00	J2000	Velocity : 0.00	SGR 0501+4516

### Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
SGR Observation	3.00	2	3 day	00:00:00	24:00:00	0

### Session Constraints:

Name	Constraints	Comments
SGR Observation		Please center on LST of 5h and conduct both observations on or around 2008 August 30. Observations during the night or early morning are strongly preferred since we will be observing at 1.3cm.

### Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
SGR Observation	SGR	20cm	1.0 hour	0.8 mJy/bm	
SGR Observation	SGR	6cm	0.5 hour	0.2 mJy/bm	
SGR Observation	SGR	3.6cm	0.5 hour	0.1 mJy/bm	

Session Name	Source	Resource	Time	Figure of Merit	Subarray
SGR Observation	SGR	1.3 cm	1.0 hour	0.04 mJy/bm	

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Present for observation: no

Staff support: None

Plan of Dissertation: no