



Observing Application

Date : May, 31 2012
Proposal ID : VLA/12A-482
Legacy ID : AS1186
PI : Alicia Soderberg
Type : Director's Discretionary
Time - Target of Opportunity
Category : Energetic Transients and Pulsars
Total Time : 6.0

JVLA Monitoring of the Type Ia SN2012cg: Searching for Evidence of Nova Shells

Abstract:

Recently, the Type Ia SN2012cg was discovered in NGC 4424 (d=15 Mpc) by the UC Berkeley KAIT SN team within just days of explosion. The host galaxy is strongly star forming and our early optical spectroscopy revealed particularly deep and multi-component Na ID absorption features indicative of dense material along the line of sight. Similar features are seen for a handful of SNe Ia and are argued to be associated with the circumbinary environment on radial scales, 1e16-1e17 cm, possibly produced by pre-explosion nova eruptions. This is one of the nearest SNe Ia with strong Na ID features detected. Our initial JVLA observation revealed a non-detection of SN2012cg, however, the observation only sampled the inner 1e15 cm region around the progenitor system. Here we propose a 7 month monitoring campaign to target the interaction of the SN shockwave with material at ~ 1e17 cm to probe the region of the putative nova shell. These observations will be coordinated with our Harvard/CfA high-resolution spectroscopy campaign to monitor the evolution of the absorption profiles and, in turn, pin down the mass and location of the dense shell.

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Related proposals:

11B-217

Joint:

Not a Joint Proposal

Observing type(s):

Continuum

VLA Resources

Name	Conf.	Frontend & Backend	Setup
C-band	Any	C Band 6 cm 4000-8000 MHz WIDAR OSRO, Full Polarization	Rest frequencies: 5000.0,6000.0 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz Total Bandwidth: 2,048.00 MHz

Sources:

Name	Position		Velocity		Group
SN2012cg-optical	Coordinate System	Equatorial	Convention	Radio	SN2012cg
	Equinox	J2000			
	Right Ascension	12:27:12.83 00:00:00.0	Ref. Frame	LSRK	
	Declination	+09:25:13.2 00:00:00.0	Velocity	0.00	

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
SN	1.00	6	30 day	09:00:00	15:00:00	0

Session Constraints:

Name	Constraints	Comments

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
SN	SN2012cg-optical	C-band	1.0 hour	0.005 mJy/bm	

Present for observation: no

Staff support: None

Plan of Dissertation: no