



Observing Application

Date : Jun, 05 2011
 Proposal ID : VLBA/11A-139
 Legacy ID : BB306
 PI : Michael Bietenholz
 Type : Director's Discretionary
 Time - Target of
 Opportunity
 Category : Energetic Transients and
 Pulsars
 Total Time : 20.0

VLBI observations to resolve the ejecta of SN2011dh in M51

Abstract:

On June 1.9 a new supernova was discovered coincident with a spiral arm of M51, dubbed SN2011dh. Spectroscopy indicates that the explosion is hydrogen-rich with some similarities to SN 1993J, while examination of pre-discovery HST images reveal a yellow hypergiant progenitor. Shortly after discovery, a bright (4 mJy) counterpart was discovered at 100 GHz with an optically-thin spectrum, which we also detect with SMA observations at 230 GHz. We request two VLBI observations of the SN over the next few months to resolve the ejecta geometry and measure the expansion velocity of the blastwave. The combination of high resolution radio interferometry together with our on-going multi-wavelength campaign (X-ray, optical) provides an excellent opportunity to shed light on the nature of the explosion, the dynamics of the ejecta and on the shock-acceleration mechanism. Bright SNe this close (8 Mpc) are infrequent, and SN will undoubtedly be heavily studied for several years. Such SNe being radio-bright occurs even less frequently, so this is an opportunity which should not be missed.

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Related proposals:

Joint:

Not a Joint Proposal

Observing type(s):

Continuum, Single Pointing(s), Monitoring, Astrometry

VLBA Resources

Name	Wavelength	Processor	Stations	Observing Parameters	Correlation Parameters
VLBA-K	1.3 cm	Socorro-DiFX	VLBA <input checked="" type="checkbox"/> Br <input checked="" type="checkbox"/> Fd <input checked="" type="checkbox"/> Hn <input checked="" type="checkbox"/> Kp <input checked="" type="checkbox"/> La <input checked="" type="checkbox"/> Mk <input checked="" type="checkbox"/> Kp <input checked="" type="checkbox"/> Ov <input checked="" type="checkbox"/> Pt <input checked="" type="checkbox"/> Sc <input checked="" type="checkbox"/> HSA Ar Ef <input checked="" type="checkbox"/> GBT VLA-Y27 VLA-Y1 Geodetic	Bandwidth: 16 MHz Baseband Channels 8 Sample Rate (Msample/s) 32 Bits/Sample 2 Polarization Dual Agg. Bit Rate (Mbits/sec) null	Full Polarization <input checked="" type="checkbox"/> Pulsar Gate Correlator Passes 1 Integration Period (sec) 2.0 Spectral Points /BBC 8 No of Fields 0

Sources:

Name	Position		Velocity		Group
SN2011dh	Coordinate System	Equatorial	Convention	Radio	Event
	Equinox	J2000			
	Right Ascension	13:30:05.8 00:00:00.0	Ref. Frame	LSRK	
	Declination	+47:10:11.2 00:00:00.0	Velocity	0.00	

Sessions:

Name	Session Time (hours)	Repeat	Separation	GST minimum	GST maximum	Elevation Minimum
SN1	10.00	2	120 day	00:00:00	24:00:00	0

Session Constraints:

Name	Constraints	Comments
SN1		We request two VLBI epochs one between Aug. and Sep 1 and one between Oct 1 and the end of 2011

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit
SN1	SN2011dh	VLBA-K	10.0 hour	0.0001 mJy/bm

Staff support: None

Plan of Dissertation: no