



Observing Application

Date: Apr 28, 2007
 Proposal ID: VLA/07B-273
Legacy ID: AK666
 PI: Elmar Koerding
 Type: Rapid Response
 Target of Opportunity
 Category: Stellar, Galactic
 Total time: 16.0 hour

The on-going radio outburst of the cataclysmic variable SS Cyg

Abstract:

In the VLA proposal AK649 we argued that if cataclysmic variables (CVs) were similar to X-ray binaries (XRBs), they might show radio synchrotron emission from jets during the optical rise phase in their outbursts. This has been spectacularly confirmed by our recent observations of the development of a 1 mJy radio source during the most recent (and on-going) optical outburst of SS Cyg. Here we request another 14 hours of VLA time to follow the evolution of this intriguing source, to further probe the parallels between episodic radio emission from white dwarf and black hole/neutron star binaries.

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Related proposals:

AK649

Joint:

Not a Joint Proposal

Observing type(s):

Continuum, Monitoring, *

Resources:

Resource name	Tele. Conf.	Frontend & Backend	Set up
X-band	VLA Any	X Band 3.6 cm 8080 - 8750 MHz VLA Correlator - Single Channel Continuum	Bandwidth: 50 MHz Rest frequencies: 8435.1,8485.1 MHz
C-band	VLA Any	C Band 6 cm 4200 - 7700 MHz VLA Correlator - Single Channel Continuum	Bandwidth: 50 MHz Rest frequencies: 4885.1,4835.1 MHz

Sources:

Source name	RA / RA Range	DEC / DEC Range	System	Velocity/z	Group name
SS Cyg	21:42:42.8 00:00:00.0	+43:35:10 00:00:00	J2000	0 km/s	

Sessions:

Session Name	Session Time	Repeat	Separation	LST Minimum	LST Maximum	Elevation Minimum
Source monitoring	2.0 hours	4	2 days	00:00:00	24:00:00	0
z-Optical decay	2.0 hours	1	0 day	00:00:00	24:00:00	0
z-Optical quiescence	2.0 hours	1	0 day	00:00:00	24:00:00	0
ASAP	4.0 hours	1	0 day	00:00:00	24:00:00	0

Session Constraints:

Session Name	Constraint	Comments
Source monitoring	First of these sessions should be scheduled 2 days after the ASAP session.	This series of 4 observations is intended to track the source into (radio) quiescence. Should the first (ASAP) observations give no detection, we will abandon this series of observations entirely. Similarly, once any of this series gives a non-detection, we will abandon the rest of the series. Note that we do NOT wish to abandon the other sessions, devoted to the optical decay and optical quiescence respectively, even if this monitoring series shows that the original source has vanished.
z-Optical decay	Schedule during optical decay, as determined by AAVSO monitoring. This will likely be one to two weeks from now (April 27).	This should be scheduled during the optical decay, which generally lasts about a week, as determined by on-going AAVSO monitoring. The goal is to see whether a similar radio burst occurs during optical decay.
z-Optical quiescence	Should be scheduled at least two days after the optical outburst is over, as determined by on-going AAVSO observations.	This should be scheduled at least two days after SS Cyg has returned to optical quiescence (visual magnitude below 11.8). The goal is to determine a baseline level for the quiescent radio emission, since no previous observations have gone deep enough to provide a useful constraint. There is generally about a month between outbursts, so these observations would likely take place sometime in June.

ASAP	AS SOON AS POSSIBLE. The C- and X-band observations must be simultaneous (or nearly so) to provide useful spectral index information on this rapidly-evolving source.	Please schedule AS SOON AS POSSIBLE. The goals are (1) to track the continued evolution of the radio flux density at 8.5 GHz, and (2) to obtain a radio spectral index, to constrain the emission mechanism.
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Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit
Source monitoring	SS Cyg/	X-band	2.0 hour	0.02mJy/bm
z-Optical decay	SS Cyg/	X-band	2.0 hour	0.02mJy/bm
z-Optical quiescence	SS Cyg/	X-band	2.0 hour	0.02mJy/bm
ASAP	SS Cyg/	X-band	2.0 hour	0.02mJy/bm
ASAP	SS Cyg/	C-band	2.0 hour	0.02mJy/bm

Total Time per Configuration:

Configuration	Total Time
Any	16.0

Present for observation: yes Staff support: None