VLA OBSERVING APPLICATION

A

rcvd:

DEADLINES: 1st of Feb., June., Oct. for next configuration following review
INSTRUCTIONS: Each numbered item must have an entry or N/A
E-MAIL TO: propsoc@nrao.edu (different for some Rapid Response Science)
OR MAIL TO: Director NRAO, 520 Edgemont Rd., Charlottesville, VA 22903-2475

(1) Date Prepared:

(2) Title of Proposal: Confirmation of the Spectral Index and Attempting to Resolve the cm Continuum Emission Associated with the Surprising Spitzer-Detected Source, L1014-IRS

(3) AUTHORS (Add * for new location)	INSTITUTION	E-mail	G/U	Students Only: For Thesis?	Students Only: Ph.D. Year
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Spitzer c2d Legacy Team					

(4) Related VLA previous proposal number(s): AS805

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(7) Scientific Category: ◯ solar system ⊗ galactic ◯ extragalactic ◯ other:
Rapid Response Science: ◯ Known Transient ⊗ Exploratory ◯ Target of Opportunity

(8) Configurations (one per column) (A+Pt, A, B, C, D, BnA, CnB, DnC, Any)	A	A			
(9) Wavelength(s) (400, 90, 20, 6, 3.5, 2, 1.3, 0.7 cm)	20 cm	6 cm			
(10) Time requested (hours)	1	2			

(11) Type of observation: ⊗ continuum ◯ spectroscopy ⊗ multichannel continuum ◯ polarimetry ◯ solar
(check all that apply) ◯ pulsar ◯ high-time resolution ◯ Pie Town link ◯ other:

(12) Suitable for dynamic scheduling? ⊗ Suitable ◯ Unsuitable

(13) ABSTRACT (do not write outside this space)

Observations with the Spitzer Space Telescope have identified a mid-infrared source within a dense core, L1014, which was previously thought to harbor no internal source and which shows no evidence for a molecular outflow. This surprising discovery may indicate an extremely young protostar. A deep VLA search for 3.6 cm and 6 cm continuum emission in D-array yielded a 100 μJy, unresolved source at 3.6cm. Surprisingly, the spectral index between 3.6cm and 6cm is negative, $\alpha = -0.9$, indicating that the emission is non-thermal and probably due to synchrotron emission. A steep negative spectral is ***very unusual*** toward embedded low-mass protostars. We must (1) check that the source is not variable and (2) attempt to resolve the emission to confirm this surprising result and to constrain the emission mechanism. We request exploratory A-array observations at 20 cm and 6 cm to test our results. We predict a flux of 530 μJy at 20 cm.

NRAO use only
(08/03)

(14) Observer present for observations? ⊗ Yes ○ No Data analysis at? ⊗ Home ⊗ AOC or CV (2 weeks notice)

(15) Help required: ⊗ None ○ Consultation ○ Friend (extensive help)

(16) Spectroscopy only	line 1	line 2	line 3	line 4
Transition (HI, OH, etc.)				
Rest Frequency (MHz)				
Velocity (km/s)				
Observing frequency (MHz)				
Correlator mode				
IF bandwidth(s) (MHz)				
Hanning smoothing (y/n)				
Number of channels per IF				
Frequency Resolution (kHz/channel)				
Rms noise (mJy/bm, nat. weight., 1 hr)				
Rms noise (K, nat. weight., 1 hr)				

(17) Number of sources:	**1**

(If more than 10 please attach list. If more than 30 give only selection criteria and LST range(s).)

(18) NAME	Coordinates 1950 ○ 2000 ⊗ RA hh mm Dec. ± xx.x°	Conf.	λ (cm)	Corr. mode	Band-width per IF (MHz)	Total Flux (Jy)*	LAS	Required rms (mJy/bm)	Required dynamic range	Time request (hr)
L1014-IRS	21h 24m , +50.0d	A	20	1A	50	0.0005	40″	0.060	6	1
L1014-IRS	21h 24m , +50.0d	A	6		50	0.0001	10″	0.035	6	2

*For spectral line, this should be the total flux at the peak of the line

Notes to the table (if any):

(19) Restrictions to elevation (other than hardware limits) or HA range (give reason):

(20) Preferred range of dates for scheduling (give reason):

(21) Dates which are not acceptable:

(22) Special hardware, software, or operating requirements:

(23) Please attach a self-contained Scientific Justification **not in excess of 1000 words.** (Preprints or reprints will be ignored.) Please include the full addresses (postal and e-mail) for first-time users or for those that have moved (if not contact author). When your proposal is scheduled, the contents of the cover sheets become public information (Any supporting pages are for refereeing only).

v4.2 8/03