



# Observing Application

Date : Sep, 09 2008  
 Proposal ID : VLA/08C-234  
 Legacy ID : AV308  
 PI : Marten van Kerkwijk  
 Type : Rapid Response -  
 Exploratory Time  
 Category : Stellar  
 Total Time : 1.5

## A radio counterpart to a young star with a planetary mass candidate companion?

### Abstract:

We have discovered a planetary mass candidate companion to 1RXS J160929.1-210524, a roughly solar-mass member of the ~5-Myr old Upper Scorpius association. The candidate companion, separated by 2.22" or 330AU at ~150pc, has infrared colors and spectra suggesting a ~L4 spectral type and a temperature of 1800(+200/-100)K. Near-infrared spectra provide clear evidence of low surface gravity, and thus youth. Based on the widely used DUSTY models, we infer a mass of 8(+4/-1)Mjupiter. If gravitationally bound, this would be the lowest mass companion imaged around a normal star thus far, and its existence at such a large separation would pose a serious challenge to theories of star and planet formation.

Coincident in position with the above objects is a 5mJy NVSS source. We propose exploratory 21 and 6-cm observations to (i) Determine if the radio source is associated with the host or its candidate companion; and, if so, (ii) verify whether it is sufficiently bright for VLBA to determine a parallax. Note that if the radio emission were from the planetary mass companion, this would generate great interest in its own right.

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### Related proposals:

If succesful, this would lead to a VLBA proposal.

### 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
A/L	A	L Band 20 cm 1000 - 2000 MHz VLA Correlator - Single Channel Continuum	Rest frequencies: 1464.9,1385.1 MHz Bandwidth: 50 MHz
A/C	A	C Band 6 cm 4200-7700 MHz VLA Correlator - Single Channel Continuum	Rest frequencies: 4885.1,4835.1 MHz Bandwidth: 50 MHz

### Sources:

Name	RA / RA Range	Dec / Dec Range	Epoch	Velocity / z	Group
1RXS J160929.1-210524	16:09:30.3 00:00:00.0	-21:04:58 00:00:00	J2000	Velocity : 0.00	usco-member

### Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
A/L	0.75	1	0 day	00:00:00	24:00:00	0
A/C	0.75	1	0 day	00:00:00	24:00:00	0

### Session Constraints:

Name	Constraints	Comments

### Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
A/L	1RXS J160929.1-210524	A/L	0.75 hour	0.1 mJy/bm	
A/C	1RXS J160929.1-210524	A/C	0.75 hour	0.1 mJy/bm	

Present for observation: no

Staff support: Consultation

Plan of Dissertation: no