



Observing Application

Date : Mar, 04 2009
 Proposal ID : VLA/09A-193
 Legacy ID : AG820
 PI : Lincoln Greenhill
 Type : Rapid Response -
 Exploratory Time
 Category : Galactic
 Total Time : 7.0

What Sources are Responsible for the Observed Very Hot NH3 in Orion BN/KL?

Abstract:

Ammonia emission from metastable energy levels up to 2000 K above ground is known in Orion BN/KL (J,K=14). However, the sources responsible for heating this gas have not been identified, because the high quantum number, metastable inversion transitions of NH3 are in the previously unavailable Ka band. We propose shared-risk Ka/K-band observations to map emission from hot NH3. We will image 13 transitions (J,K=4,4 ... 15,15, and 10,9) with upper state energies up to 2200K. The upper transitions will be optically thin, allowing us to obtain rotational/kinetic temperatures and column densities. Earlier compact-VLA and single-dish studies suggest that the hot material is compact on < 1" scales, but the complex structure of the region (particularly the Hot Core) creates confusion. Leveraging B-configuration resolution and access to new frequency space, we will better localize emission. This will enable new identifications of compact sources and estimates of luminosity, including for the YSO known as radio Source-I. We will evaluate the role of Source-I and other detected objects in powering the BN/KL region.

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Related proposals:

AG776, AG815, AC952

Joint:

Not a Joint Proposal

Observing type(s):

Spectroscopy

VLA Resources

Name	Conf.	Frontend & Backend	Setup
KA-9-9	B	Ka Band 0.9 cm 26500 - 40000 MHz VLA Correlator - Spectral Line	Rest frequencies: 27477.94,27477.94 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
KA-10-10	B	Ka Band 0.9 cm 26500 - 40000 MHz VLA Correlator - Spectral Line	Rest frequencies: 28604.74,28604.74 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
KA-11-11	B	Ka Band 0.9 cm 26500 - 40000 MHz VLA Correlator - Spectral Line	Rest frequencies: 29914.49,29914.49 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
KA-12-12	B	Ka Band 0.9 cm 26500 - 40000 MHz VLA Correlator - Spectral Line	Rest frequencies: 31424.94,31424.94 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
KA-13-13	B	Ka Band 0.9 cm 26500 - 40000 MHz VLA Correlator - Spectral Line	Rest frequencies: 33156.85,33156.85 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
KA-14-14	B	Ka Band 0.9 cm 26500 - 40000 MHz VLA Correlator - Spectral Line	Rest frequencies: 35134.30,35134.30 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
KA-15-15	B	Ka Band 0.9 cm 26500 - 40000 MHz VLA Correlator - Spectral Line	Rest frequencies: 37385.13,37385.13 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
K-4-4	B	K Band 1.3 cm 18000 - 26500 MHz VLA Correlator - Spectral Line	Rest frequencies: 24139.42,24139.42 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64

Name	Conf.	Frontend & Backend	Setup
K-5-5	B	K Band 1.3 cm 18000 - 26500 MHz VLA Correlator - Spectral Line	Rest frequencies: 24532.99,24532.99 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
K-6-6	B	K Band 1.3 cm 18000 - 26500 MHz VLA Correlator - Spectral Line	Rest frequencies: 25056.03,25056.03 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
K-7-7	B	K Band 1.3 cm 18000 - 26500 MHz VLA Correlator - Spectral Line	Rest frequencies: 25715.18,25715.18 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
K-8-8	B	K Band 1.3 cm 18000 - 26500 MHz VLA Correlator - Spectral Line	Rest frequencies: 26518.91,26518.91 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64
K-10-9	B	K Band 1.3 cm 18000 - 26500 MHz VLA Correlator - Spectral Line	Rest frequencies: 24205.29, 24205.29 MHz Bandwidth: 6.25 MHz Spectral resolution: 97.656 kHz IF Mode: 2 No. of Channels: 64

Sources:

Name	RA / RA Range	Dec / Dec Range	Epoch	Velocity / z	Group
SRCI	05:35:14.5 00:00:00.0	-5:22:30 00:00:00	J2000	Velocity : 5	BNKL_NH3

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
SRCI-obs	1.00	1	0 day	02:00:00	09:00:00	25
SRCI-obs	1.00	1	0 day	02:00:00	09:00:00	25
SRCI-obs	1.00	1	0 day	02:00:00	09:00:00	25
SRCI-obs	1.00	1	0 day	02:00:00	09:00:00	25
SRCI-obs	1.00	1	0 day	02:00:00	09:00:00	25
SRCI-obs	1.00	1	0 day	02:00:00	09:00:00	25
SRCI-obs	1.00	1	0 day	02:00:00	09:00:00	25

Session Constraints:

Name	Constraints	Comments

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
SRCI-obs	SRCI	K-4-4	1.0 hour	6 mJy/bm	1
SRCI-obs	SRCI	KA-9-9	1.0 hour	10 mJy/bm	2
SRCI-obs	SRCI	K-5-5	1.0 hour	6 mJy/bm	1
SRCI-obs	SRCI	KA-10-10	1.0 hour	10 mJy/bm	2
SRCI-obs	SRCI	K-6-6	1.0 hour	6 mJy/bm	1
SRCI-obs	SRCI	KA-11-11	1.0 hour	10 mJy/bm	2
SRCI-obs	SRCI	KA-12-12	1.0 hour	10 mJy/bm	1
SRCI-obs	SRCI	K-7-7	1.0 hour	6 mJy/bm	2
SRCI-obs	SRCI	KA-13-13	1.0 hour	10 mJy/bm	1
SRCI-obs	SRCI	K-8-8	1.0 hour	6 mJy/bm	2
SRCI-obs	SRCI	KA-14-14	1.0 hour	10 mJy/bm	1
SRCI-obs	SRCI	K-10-9	1.0 hour	6 mJy/bm	2
SRCI-obs	SRCI	KA-15-15	1.0 hour	10 mJy/bm	1
SRCI-obs	SRCI	K-10-9	1.0 hour	6 mJy/bm	2

Present for observation: no

Staff support: None

Plan of Dissertation: no