Observing Application

Date :	Aug, 30 2010
Proposal ID :	VLA/10B-241
Legacy ID :	AO268
PI :	Juergen Ott
Type :	Rapid Response - Exploratory Time
Category :	Extragalactic
Total Time :	10.0

EVLA Confirmation of Ammonia in MG0414+0534 at z=2.64

Abstract:

Recently we made a tentative detection of ammonia in emission toward the lensed quasar MG0414+0534 at a redshift of 2.64 with the Arecibo telescope. If confirmed, this discovery will dramatically extend the redshift range of detected ammonia out to cosmological distances, and would open up a window for precise temperature measurements of molecular gas across galaxy evolution timescales. We propose to confirm this line with the EVLA and apply the extraordinary capabilities of WIDAR to simultaneously observe all ammonia inversion lines from (1,1) through (6,6). We will be able to (a) confirm the detection of ammonia (3,3); (b) secure this result via the detection of other inversion lines; (c) derive the temperature of the gas in this lensed quasar with the accurate ammonia thermometer - a first at those redshifts; (d) investigate whether the (3,3) line has a maser origin, especially if the other inversion lines are not detected in emission - a maser would constrain density and temperature of the gas even better than the use of thermal lines; (e) together with rotation lines, the inversion transitions of ammonia will allow us to derive the fundamental proton-to-electron ratio constant at an unprecedented redshift.

Authors:

Name	Institution	Email	Status
Juergen Ott	National Radio Astronomy Observatory	jott@nrao.edu	
C. M. Violette Impellizzeri	National Radio Astronomy Observatory	violette@nrao.edu	
Emmanuel Momjian	National Radio Astronomy Observatory	emomjian@nrao.edu	
Paola Castangia	Istituto Nazionale di Astrofisica	pcastang@ca.astro.it	
John McKean	Netherlands Foundation for Research in Astronomy	mckean@astron.nl	
Christian Henkel	Max-Planck-Institut für Radioastronomie	p220hen@mpifr-bonn.mpg.de	
Andreas Brunthaler	Max-Planck-Institut für Radioastronomie	brunthal@mpifr-bonn.mpg.de	
Alan Roy	Max-Planck-Institut für Radioastronomie	aroy@mpifr-bonn.mpg.de	
Olaf Wucknitz	Universitat Bonn	wucknitz@astro.uni-bonn.de	

Principal Investigator: Juergen Ott
Contact: Juergen Ott
Telephone: +1-575-835-7174
Email: jott@nrao.edu

Related proposals:

Joint:

Not a Joint Proposal

Observing type(s):

Spectroscopy

VLA Resources

Name	Conf.	Frontend & Backend	Setup
C	Any	C Band 6 cm 4000-8000 MHz WIDAR ECSO	Comments: Up to 16 subbands with 32MHz bandwidth each, placed at the nearest possible frequencies that cover the lines. Each subband is requested to have 2 polarization products and 128 channels (trading 2 pol products for more channels).

Sources:

Name	Position		Velocity		Group
MG0414+0534	**Coordinate System**	Equatorial	**Convention**	Redshift	MG-0414
	Equinox	J2000			
	Right Ascension	04:14:37.76	**Ref. Frame**	Barycentric	
		00:00:00.0			
	Declination	+05:34:42	**Redshift**	2.6365	
		00:00:00			

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
0414 NH3	5.00	2	0 day	00:00:00	09:00:00	0

Session Constraints:

Name	Constraints	Comments
0414 NH3		the sessions can be split further in smaller SBs; rms for the total requested time and for a 250kHz channel

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
0414 NH3	MG0414+0534	C	5.0 hour	0.120 mJy/bm	

Present for observation: yes Staff support: None Plan of Dissertation: no