Observing Application

Date :	Jul, 13 2011
Proposal ID :	VLA/11A-285
Legacy ID :	AV334
PI :	Bram Venemans
Type :	Director's Discretionary Time - Exploratory Time
Category :	High Redshift and Source Surveys
Total Time :	10.0

Molecular Gas in a Spectroscopically Confirmed Quasar Host Galaxy at z=7.1

Abstract:

Understanding the formation and evolution of the first supermassive black holes and galaxies is one of the most important goals in both observational and theoretical astronomy. Recently, we have discovered the most distant quasar at a redshift of z=7.085, smashing the previous record of z=6.44 by a large margin. This quasar is very bright and thus enables multi-wavelength follow-up to constrain the physical properties of a quasar that is significantly more distant than the ones studied to date. Observations with the Plateau de Bure Interferometer already revealed a significant detection of the [CII] cooling line. Here we request 10h of DDT time in the D-array configuration to put first constraints on the luminosity of the CO(2-1) line, which is redshifted to an easily accessible frequency of 28.514 GHz. The immense brightness of the quasar (M_1450=-26.6) and the detection of a strong [CII] line implies that we will likely detect CO emission from this object. The detection will be by far the highest redshift detection of the (E)VLA and will allow us to constrain the molecular gas reservoir in the earliest system that is currently accessible.

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Related proposals:

Joint:

Not a Joint Proposal

Observing type(s):

Spectroscopy

VLA Resources

Name	Conf.	Frontend & Backend	Setup
quasar	D	Ka Band 0.9 cm 26500 - 40000 MHz WIDAR OSRO1: 2 Subbands/Full polz	Rest frequencies: 28514 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz

Sources:

Name	Position		Velocity		Group
ULASJ1120+0641	**Coordinate System**	Equatorial	**Convention**	Redshift	J1120
	Equinox	J2000			
	Right Ascension	11:20:01.48	**Ref. Frame**	LSRK	
		00:00:00.0			
	Declination	+06:41:24.4	**Redshift**	7.085	
		00:00:00.0			

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
quasar1	5.00	2	0 day	06:20:00	16:20:00	35

Session Constraints:

Name	Constraints	Comments
quasar1		rms given is for full observing run (2 sessions) over 800 km/s (76 MHz) bandpass

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
quasar1	ULASJ1120+0641	quasar	5.0 hour	0.016 mJy/bm	

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