Observing Application

Date :	Nov, 18 2011
Proposal ID :	VLA/11B-233
Legacy ID :	AC1082
PI :	Chris Carilli
Type :	Director's Discretionary Time - Exploratory Time
Category :	High Redshift and Source Surveys
Total Time :	6.0

The CO excitation in the first submm galaxy: HDF850.1 at z=5.2

Abstract:

We propose to observe CO 2-1 emission from the first submm galaxy ever discovered, HDF850.1. The first submm observations of the HDF revolutionized our understanding of galaxy formation, by showing that about half the star formation at z > 2 occurs in luminous starburst galaxies that are totally dust-obscured at optical wavelengths. Amazingly, that conclusion, which has been confirmed subsequently, was based on only one bright source (HDF850.1), and 4 fainter sources. Moreover, no redshift was available for HDF850.1, and a high redshift was only inferred from the radio to submm flux ratio. We recently determined a redshift of z=5.185 for HDF850.1 via the detection of CO 5-4 and 6-5. This redshift is much higher than originally thought possible for luminous starbursts, and is yet more evidence that dusty starburst galaxies exist within 1Gyr of the big bang, representing the very early formation of massive elliptical galaxies. We propose to observe CO 2-1 emission from HDF850.1 using 6hrs with the EVLA, to determine the molecular gas mass and excitation. The D or DnC arrays, or during reconfiguration, are all well suited for this detection experiment.

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Related proposals:

Joint:

Not a Joint Proposal

Observing type(s):

Spectroscopy

VLA Resources

Name	Conf.	Frontend & Backend	Setup

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test2	D	Ka Band 0.9 cm 26500 - 40000 MHz WIDAR OSRO1: 2 Subbands/Full polz	Rest frequencies: 37187, 36163 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz

Sources:

Name	Position		Velocity		Group
1236+6212	**Coordinate System**	Equatorial	**Convention**	Radio	hdf850g
	Equinox	J2000			
	Right Ascension	12:36:52.1	**Ref. Frame**	Barycentric	
		00:00:00.0			
	Declination	+62:12:25.8	**Velocity**	5.128	
		00:00:00.0			

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
850	3.00	2	0 day	05:00:00	20:00:00	30

Session Constraints:

Name	Constraints	Comments

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
850	1236+6212	test2	3.0 hour	0.05 mJy/bm	

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