



Observing Application

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 Proposal ID : VLA/12A-462
 Legacy ID : AK795
 PI : Amanda Kepley
 Type : Director's Discretionary
 Time - Exploratory Time
 Category : Extragalactic Structure
 Total Time : 10.0

Using RRLs to Probe Star Formation in a Low-Metallicity Dwarf Starburst Galaxy

Abstract:

How stars are formed may depend on their environment. A particularly important and relatively unexplored environment to understand star formation in is galaxies with high star formation rates, low masses, and low metallicities. The ionized gas properties of their young massive star-forming regions provide vital information about their interstellar medium and young massive stars. Unfortunately, these regions have a significant amount of dust making optical and infrared ionized gas tracers much less effective. Their ionized gas can be measured using radio recombination lines (RRLs), which -- once emitted -- are not affected by dust. We proposed to observe 13 RRLs and the associated continuum in the nearby, low-metallicity, dwarf starburst galaxy NGC 1569. We will measure the density, filling factor, kinematics and mass of the ionized gas. Using these measurements, we will test whether the interstellar gas in NGC 1569 is mostly ionized due to the harder and more intense radiation fields in NGC 1569, whether the harder radiation fields lead to more dense ionized gas, and whether the young clusters are more massive than those to the Milky Way due to the lack of shear in NGC 1569.

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Related proposals:

12A-184, 12A-186

Joint:

Not a Joint Proposal

Observing type(s):

Continuum, Spectroscopy, Single Pointing(s)

VLA Resources

Name	Conf.	Frontend & Backend	Setup
C band - CnB	CnB	C Band 6 cm 4000-8000 MHz WIDAR RSRO	Comments: We will allocate eight 128 MHz wide, dual polarization sub-bands per baseband to measure the continuum. We will place five 16 MHz wide sub-bands with 256 channels at 6.75 GHz and eight 32 MHz wide sub-bands with 256 channels at 5.0 GHz tuned to the frequency of each RRL in the baseband. We will set the integration time to 6s. This correlator configuration is being developed and tested by the PI as part of her RSRO.

Sources:

Name	Position		Velocity		Group
ngc1569	Coordinate System	Equatorial	Convention	Optical	NGC1569
	Equinox	J2000			
	Right Ascension	04:30:49.05 00:00:00.0	Ref. Frame	Barycentric	
	Declination	+64:50:52.5 00:00:00.0	Redshift	-0.000297	

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
ngc1569 - Cband - CnB	2.50	4	0 day	22:30:00	10:45:00	30

Session Constraints:

Name	Constraints	Comments
ngc1569 - Cband - CnB		>5 sigma detection of stacked lines (5 at 6.75 GHz and 8 at 5.0 GHz). 250 kHz (11 km/s) channels. We plan to observe this source during the unsubscribed LST ranges of 23:00-1:00 and 07:00-11:00 in CnB configuration.

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
ngc1569 - Cband - CnB	ngc1569	C band - CnB	2.5 hour	0.151 mJy/bm	

Present for observation: no

Staff support: None

Plan of Dissertation: no