Observing Application

Date :	Mar, 07 2013
Proposal ID :	VLA/13A-503
Legacy ID :	AB1478
PI :	Annalisa Bonafede
Type :	Director's Discretionary Time - Exploratory Time
Category :	Normal Galaxies, Groups, and Clusters
Total Time :	16.0

The cluster PLCKG287: a unique opportunity to unravel the origin of radio relics

Abstract:

Radio relics are arc-shaped radio sources located at the periphery of
galaxy clusters, and not directly associated with any cluster radio galaxy.
Their extension, of the order of 1 Mpc, indicates that the emitting
relativistic electrons need to be (re)accelerated locally. Several models have been proposed so far, but the available radio observations do not allow to test them precisely. In a cluster recently observed we have found a radio relic whose emission fades gradually into the bent lobes of a radio galaxy. This spectacular emission is the first ever detected probe that relics are fed by the dead plasma coming from the lobes of radio galaxies, and reenergised by some powerful event, like shocks. In order to verify this hypothesis, the spectral index of the emission needs to be determined. We are therefore asking for 1.5 and 3 GHz observation in order to obtain a spectral index image of the system. The proposed observations will directly address the fundamental problem of particle acceleration at low-Mach number shocks, and prove that the radio emitting electrons are re-accelerated from fossil radio lobes. This would unambiguously probe the mechanism that leads to the relic emission.

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Related proposals:

Joint:

Not a Joint Proposal

Observing type(s):

Continuum, Polarimetry

VLA Resources

Name	Conf.	Frontend & Backend	Setup
S_DnC	DnC	S Band 10 cm 2000 - 4000 MHz WIDAR OSRO, Full Polarization	Rest frequencies: 2500.0,3500.0 MHz Subband Bandwidth: 128.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 2000.0 kHz Total Bandwidth: 2,048.00 MHz
L_CnB	CnB	L Band 20 cm 1000 - 2000 MHz WIDAR OSRO, Full Polarization	Rest frequencies: 1250.0,1750.0 MHz Subband Bandwidth: 64.0 MHz No. of Channels: 64 Poln. products: 4.0 Channel Width: 1000.0 kHz Total Bandwidth: 1,024.00 MHz

Sources:

Name	Position		Velocity		Group
target	**Coordinate System**	Equatorial	**Convention**	Radio	PLCKG28.7+32.9
	Equinox	J2000			
	Right Ascension	11:05:51.0 00:00:00.0	**Ref. Frame**	LSRK	
	Declination	-28:04:09.0 00:00:00.0	**Velocity**	0.00	
	Calibrator	No			

Sessions:

Name	Session Time (hours)	Repeat	Separation	LST minimum	LST maximum	Elevation Minimum
S_DnC	4.00	2	0 day	00:00:00	24:00:00	0
L_CnB	4.00	2	0 day	00:00:00	24:00:00	0

Session Constraints:

Name	Constraints	Comments
S_DnC		The time request is computed on the basis of the desired uv-coverage and in order to detect the polarization rather than to achieve the rms noise in Stokes I (see scientific justification)
L_CnB		The time request is computed on the basis of the desired uv-coverage and in order to detect the polarization rather than to achieve the rms noise in Stokes I (see scientific justification)

Session Source/Resource Pairs:

Session Name	Source	Resource	Time	Figure of Merit	Subarray
S_DnC	target	S_DnC	4.0 hour	0.015 mJy/bm	