



11104 - The nature of radio transients

Cycle: 16, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) VLA172059.9+385227	WFPC2	4	21-May-2007 19:14:40.0	yes

4 Total Orbits Used

ABSTRACT

We have conducted the first ever blind, wide-field survey for radio transients (Levinson et al. 2002; Gal-Yam et al. 2006). We have discovered four radio transients and explored their nature using radio and optical follow-up observations. One is a known pulsar, one is a $z \sim 0.1$ AGN, and one is most probably an optically obscured radio supernova (SN) in the nearby galaxy NGC 4216 (the first such event to be discovered by a wide field radio survey). The last source appears not to be associated with a bright host galaxy (to a limit of $R < 24.5$ mag). We request 4 orbits of WFPC2 F606W imaging to check whether we can establish an association between this radio transient and any of three nearby faint resolved galaxies we have detected from the ground. If the source is associated with any of these galaxies it would represent a new type of extra-galactic radio bursts, more

luminous than, e.g., radio afterglows of gamma-ray bursts. Alternatively, ruling out an association with these galaxies would disfavor an extragalactic nature of this object, and suggest instead that this is a radio outburst of a faint Galactic compact object, probably a new type of radio-flaring neutron star. If this is the case, the high luminosity (9 mJy) and relatively high galactic latitude (33 degrees) of this source may indicate it is relatively nearby. This single source represents a large population (comparable in sky density to AGN, pulsars, and radio SNe) and thus merits intensive study. A modest investment of HST time, leveraged by massive ground-based radio and optical efforts, will allow us to identify a new class of radio sources, and complete a census of the variable radio sky down to ~ 6 mJy, leaving no unidentified objects. This result can be directly scaled to predict the number and type of transient sources expected to be detected by future surveys with the next generation radio arrays, such as ATA and SKA. Since our science critically requires HST's spatial resolution (rather than sensitivity) it is perfectly suited to be carried out with WFPC2.

OBSERVING DESCRIPTION

We will image the location of the unidentified radio transient RTC9 to look for optical counterparts and examine its association with putative nearby host galaxies.

Proposal 11104 - Visit 01 - The nature of radio transients

Visit	Proposal 11104, Visit 01										Mon May 21 23:14:43 GMT 2007	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFPC2											
	Special Requirements: (none)											
	Comments: Single visit in this proposal											
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	VLA172059.9+385227	RA: 17 20 59.9000 (260.2495833d) Dec: +38 52 27.00 (38.87417d) Equinox: J2000					V=25.0+/-1.0		Reference Frame: ICRS		
Exposures	#	Label	Target	Config,Mode,Aperture		Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	rtc9-exp1	(1) VLA172059.9+385227	WFPC2, IMAGE, WF3		F606W	CR-SPLIT=NO		Sequence 1-2 Non-Int	1100.0 Secs		
										[==>]		[1]
	2	rtc9-exp2	(1) VLA172059.9+385227	WFPC2, IMAGE, WF3		F606W	CR-SPLIT=NO	POS TARG 1.03,1.03	Sequence 1-2 Non-Int	1100.0 Secs		
										[==>]		[1]
	3	rtc9-exp3	(1) VLA172059.9+385227	WFPC2, IMAGE, WF3		F606W	CR-SPLIT=NO	POS TARG 0,1.03	Sequence 3-4 Non-Int	1100.0 Secs		
										[==>]		[2]
	4	rtc9-exp4	(1) VLA172059.9+385227	WFPC2, IMAGE, WF3		F606W	CR-SPLIT=NO	POS TARG -1.03,0	Sequence 3-4 Non-Int	1100.0 Secs		
										[==>]		[2]
	5	rtc9-exp5	(1) VLA172059.9+385227	WFPC2, IMAGE, WF3		F606W	CR-SPLIT=NO	POS TARG 1.03,0	Sequence 5-6 Non-Int	1100.0 Secs		
										[==>]		[3]
	6	rtc9-exp6	(1) VLA172059.9+385227	WFPC2, IMAGE, WF3		F606W	CR-SPLIT=NO	POS TARG -1.03,-1.03	Sequence 5-6 Non-Int	1100.0 Secs		
										[==>]		[3]
	7	rtc9-exp7	(1) VLA172059.9+385227	WFPC2, IMAGE, WF3		F606W	CR-SPLIT=NO	POS TARG -1.03,1.03	Sequence 7-8 Non-Int	1100.0 Secs		
										[==>]		[4]
	8	rtc9-exp8	(1) VLA172059.9+385227	WFPC2, IMAGE, WF3		F606W	CR-SPLIT=NO	POS TARG 1.03,-1.03	Sequence 7-8 Non-Int	1100.0 Secs		
										[==>]		[4]



