

A Study of the Cold Gas and Stellar Populations of the Antlia Cluster with KAT-7 and WISE

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KAT-7: South African MeerKAT/SKA

Drototype

Table 4: KAT–7 correlator modes.

mode	total BW	number of	channel BW	
	(MHz)	channels	(m kHz)	
c16n2M4k	1.5625	4096	0.381	
c16n7M4k	6.25	4096	1.526 ~5000	
m c16n25M4k	25	4096	6.104	
c16n400M4k	250	1024	390.625	

A return to strong radio flaring by Circinus X-1 observed with the Karoo Array Telescope test array KAT-7 (Armstrong et al 2013)

KAT-7 Science Verification: Using Hi Observations of NGC 3109 to Understand its Kinematics and Mass Distribution (Carignan, Frank, Hess, Lucero et al 2013)



Supercluster/Large Scale Structure



Radburn-Smith et al. 2006

- V_{sys} = 2900 km/s ~ 40 kpc: 3rd most nearby cluster
- Southern hemisphere & low galactic latitude
- No previous HIPASS detections
- Has an X-ray halo; lacks "cool core" component

KAT-7: Antlia Cluster Mosaic

- 7 pointing mosaic ~150 hours on source = ~21 hours per pointing
- ~4 square degrees mosaic
- 4 arcmin = 48kpc: galaxies are unresolved
- RMS = 0.85 mJy/channel
 - $-M_{HI}$ sensitivity = 3.4x10⁷ M_{sun} (3 sigma, 50 km/s)





Commissioning: RFI or Software?



FFT subtraction





Commissioning: RFI or Software?







Stellar Content: WISE



HI traces infalling substructure

Antlia Cluster



WISE W1,W2,W3



Summary

- 23 HI detected objects, +11 more candidate detections
- Antlia is HI deficient at its center like many dynamically older clusters
- HI traces substructure/infall on the outskirts of the cluster
- Only ~half of the HI detected sources are detected in WISE
- Interesting individual sources:
 - Seyfert II with HI absorption & emission.
- KAT-7 is a niche instrument producing science quality data

Future Work

- 48 hours on ATCA for resolved observations of known HI sources: evidence of interaction between hot ICM/ cold ISM.
- Spectroscopic redshifts for cluster member candidates

Thanks!