Nature of Point Sources from Aquarius Super-Cluster

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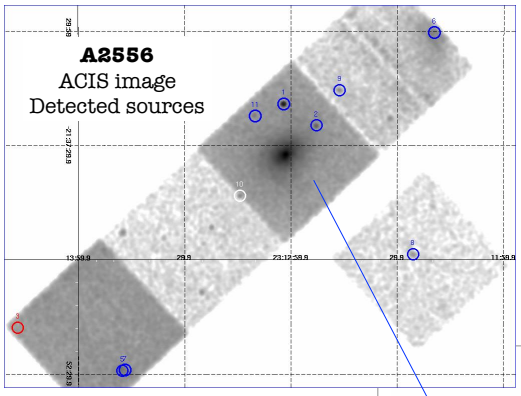
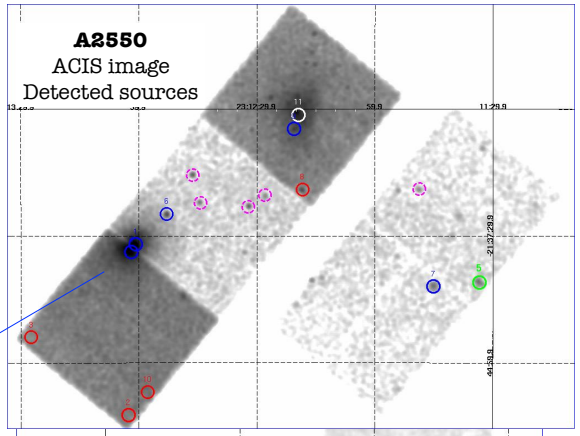
ABSTRACT

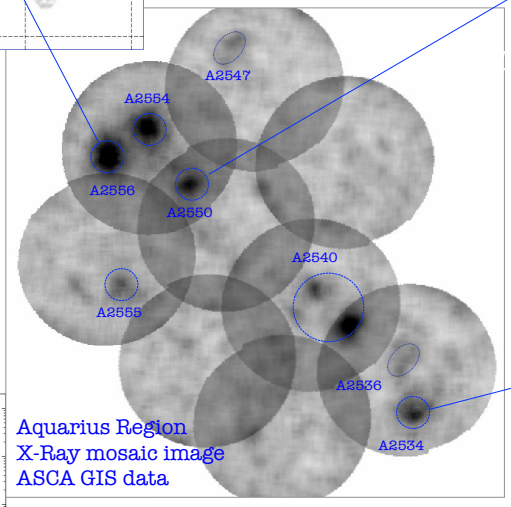
We present the results from spatial and spectral study of 30 x-ray point sources from the Aquarius supercluster, one of the highest concentrations of rich clusters in the sky. Archival Chandra and ASCA data are used for understanding the properties of extended hot plasma emissions. X-ray data mainly covers the bright rich clusters: A2534, A2550, and A2556. All the sources have optical counterparts (except 2 sources). The central bright galaxies are observed to be strong radio emitters. The X-ray spectral properties are studied and compared with Lockman Hole field-galaxies. The enhanced X-ray emission from the sources is explained by ICM galaxy interaction in the high density cluster outskirts.

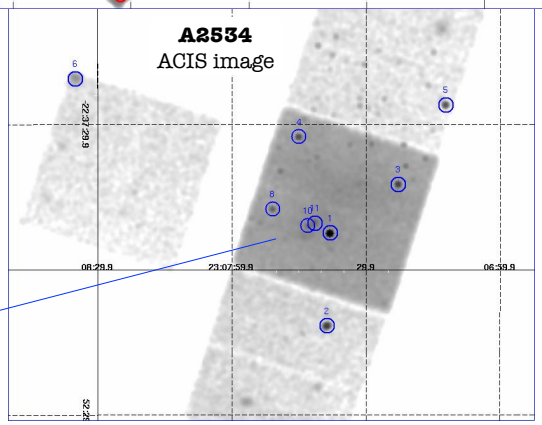
OBSERVATIONS

There about 10 clusters locate at Aquarius region. First systematic observations are performed by ASCA.In this work we have used high resolution Chandra data in order to investigate point like X-ray sources from the field. Three clusters are analzed for ACIS data. Wavelet routines are applied for the source detection. And 30 point like emission is defined. X-ray and optical properties are explored.

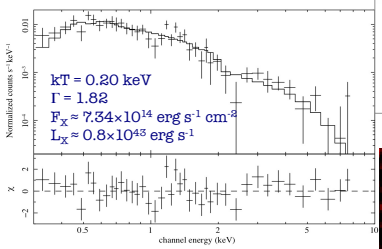


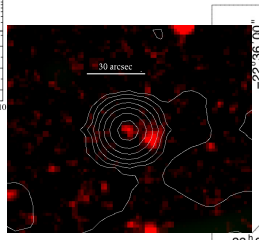


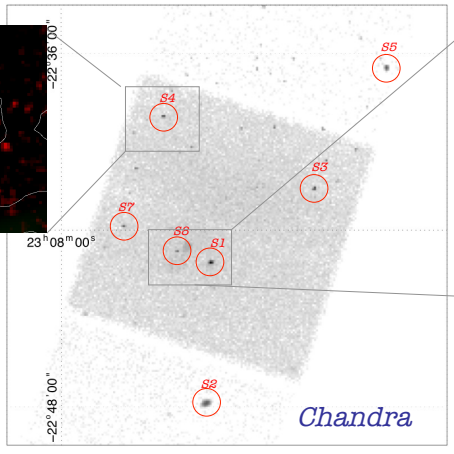


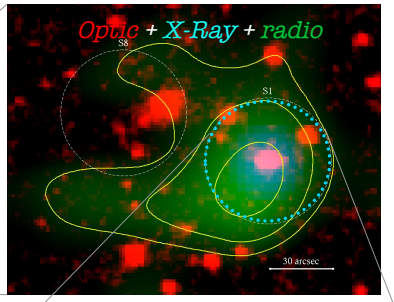


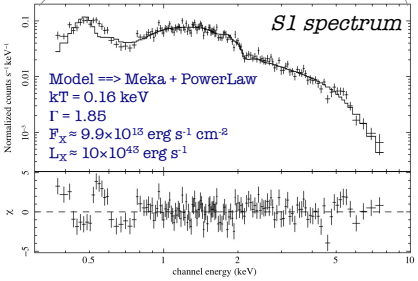
The spectral roperties are studied with meka+powerlaw model. The best fitted parameters are listed at the table below. The spectra shows the brightes sources from A2534 central ACIS-I chip. The interstellar thermal and possible active nuclei properties are studied.











The best fitted model values are in the physical range. All sources do not have redshift information. The source density is consistent with that of background sources. But if we assume that all of them locates at A2534 potential well, they are very brighth in X-ray compared to the field galaxies.

	α (2000)	δ (2000)	redshift	kT_e(keV)	Photon Index	F_X(erg s^{-1} cm^{-2})	L_X(erg s^{-1})	χ^2/dof
S1	23:07:37.9	-22:43:05.76	0.191325	0.16 ± 0.03	1.85 ± 0.07	9.92 E-13	9.970×10^{43}	248/140 = 1.77
S2	23:07:38.6	-22:47:52.56	...	$0.18^{+0.99}_{-0.17}$	$1.85^{+0.20}_{-0.15}$	2.29 E-13	2.576×10^{43}	70/61 = 1.14
S3	23:07:22.7	-22:40:34.68	0.203577	$0.07^{+0.14}_{-0.04}$	$1.82^{+0.16}_{-0.11}$	7.23 E-14	0.839×10^{43}	58/50 = 1.16
S4	23:07:44.9	-22:38:08.42	...	$0.20^{+0.19}_{-0.13}$	$1.82^{+0.15}_{-0.13}$	7.34 E-14	0.793×10^{43}	147/149 = 0.99
S5	23:07:12.0	-22:36:28.77	no obj.	$0.03^{+0.04}_{-0.03}$	$2.01^{+0.32}_{-0.25}$	1.94 E-13	2.135×10^{43}	78/80 = 0.97
S6	23:08:34.9	-22:35:07.40	no obj.	0.5	$2.13^{+0.21}_{-0.19}$	1.12 E-13	1.236×10^{43}	24/27 = 0.88
S7	23:07:50.7	-22:41:51.36	...	...	$2.35^{+0.19}_{-0.04}$	1.01 E-14	0.124×10^{43}	26/26 = 1.01
S8	23:07:42.9	-22:42:43.02	0.203397	$0.84^{+0.66}_{-0.56}$	$2.14^{+0.19}_{-0.04}$	4.78 E-14	0.601×10^{43}	136/144 = 0.94

The X-ray spectral properties are studied by power-law model for each source. The critical parameters are estimated. The table shows the calculated parameters for A2534 cluster. The flux values are compared to that of the field galaxies from Lockman hole. Our preliminary results suggest that the cluster galaxies are brighter in X-ray compared to the field galaxies. We suggest that the high probability rate of sub-group infalls and mergers in supercluster regions is triggering the X-ray emission from galaxies by fueling the AGN or awakening the BHs.

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