

HI Deficiency in X-ray Bright Groups

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Motivation

We present the results of

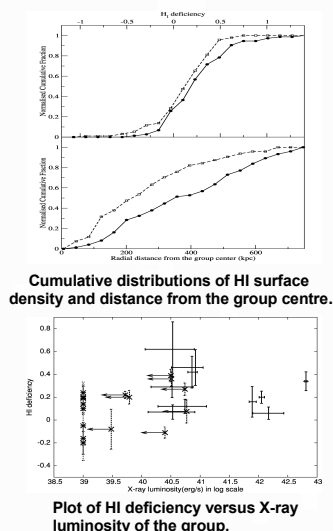
- A comparative study of the HI content of galaxies in groups with and without hot intra-group medium (IGM),
- HI imaging of some of the galaxies from X-ray bright groups.

The aim was to study the effect of the hot IGM, on the HI content of the spiral galaxies.

Sample for the comparative study:

X-ray bright groups (with X-ray emitting IGM)
- 74 galaxies from 10 groups.

Non X-ray groups (groups with X-ray upper limits and all spiral groups - 96 galaxies from 17 groups.



Results

1. Average HI def (X-ray) = 0.28 ± 0.04
Average HI def (non X-ray) = 0.09 ± 0.03
2. K-S test on the HI surface density of galaxies shows 8% chance of the two category of samples (X-ray bright and non X-ray groups) to be from same parent distribution.

(ref: Sengupta & Balasubramanyam, 2006, MNRAS, 369, 360)

The results of the above study, suggested that the IGM is responsible for the excess gas loss in the galaxies in X-ray bright groups.

GMRT HI imaging of galaxies

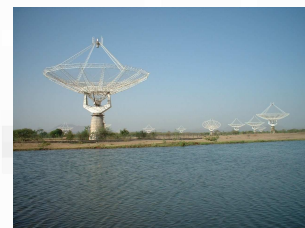
HI imaging was carried out to test if there are signatures of IGM assisted gas stripping in these galaxies, as is often found in clusters.

Simple estimates show *Ram Pressure* of the IGM is capable of stripping about 50% of HI in some cases in X-ray bright groups.

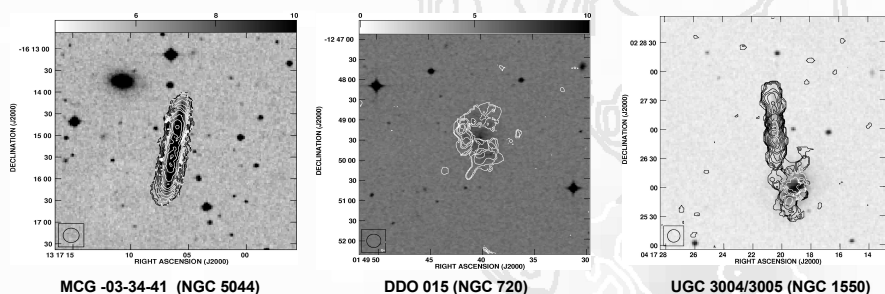
Sample for Imaging

Thirteen galaxies from the following groups were imaged.

NGC 5044 : 6 galaxies
NGC 720: 2 galaxies
NGC1550: 4 galaxies
IC 1459 : 1 galaxy



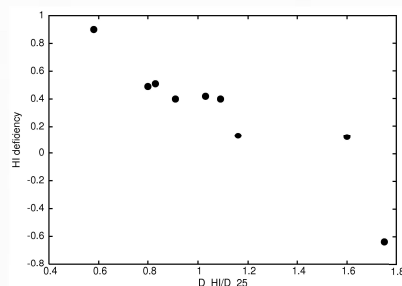
Integration time ~ 3.5 hrs on each source.
rms achieved ~ 1 mJy/beam
resolution ~ $20'' \times 20''$



Results

HI morphology are found disturbed and HI disks appear truncated.

Average $D_{H/D_{25}}$ of the sample is 1.1 ± 0.12 compared to 1.7 ± 0.05 for galaxies in field and non X-ray groups .



Plot of HI deficiency versus $D_{H/D_{25}}$

Conclusion

X-ray bright groups with their relatively higher IGM density and dispersion than non X-ray groups, present an intermediate environment between clusters and normal groups (without hot IGM). In this environment *ram pressure* (a process which otherwise is not so efficient in groups) and/or *tidal aided ram pressure* can remove gas from the galaxies leaving them HI deficient (ref: Sengupta et al, 2007, MNRAS, 378, 137).

Acknowledgment

The GMRT is operated by the National Centre for Radio Astrophysics of the Tata Institute of Fundamental Research.

References

All the references used in this work will be available at

Sengupta & Balasubramanyam, 2006, MNRAS, 369, 360.

and

Sengupta, Balasubramanyam and Dwarakanath, 2007, MNRAS, 378, 137.