

## GMRT HI imaging survey of ERIDANUS group of galaxies

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**Abstract.** This project aims to image a subset of galaxies in the nearby group Eridanus in HI emission and in radio continuum using the GMRT. The typical resolution of HI images will be  $\sim 1$  kpc with a  $3\sigma$  sensitivity to HI mass of a few times  $10^7 M_{\odot}$ . The rotation curves obtained using the HI velocity field together with the 2MASS magnitudes in the near infrared will be used to construct the Tully-Fisher relation for this group. High resolution (sub-kpc) multi-frequency radio continuum images will be used to study star-formation rates, radio morphologies and spectral indices of Eridanus galaxies. About half of the galaxies have already been observed and further observations on some late type galaxies are proposed with the GMRT. We present here the HI image and the rotation curve for a member of this group viz. NGC 1385.

*Keywords :* Galaxy – HI: Galaxy – ISM: group – galaxy

### 1. Introduction

Eridanus is a nearby group of galaxies at a distance of  $\sim 20$  Mpc. The group members are arranged in a filament like structure joining Fornax and Dorado clusters of galaxies. Total number of optically identified galaxies in this group is  $\sim 100$ . This group has almost equal number of early type and late type systems. The redshift is known for all galaxies through optical spectroscopy. The velocity dispersion of this group is  $\sim 350 \text{ km s}^{-1}$ . The dynamical study of this group shows that the group is a bound system comprising of

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several sub-groups [1]. These sub-groups are merging together and will eventually evolve to a massive cluster.

## 2. Motivations for the present study

The GMRT data of HI emission and radio continuum from the Eridanus galaxies, combined with the existing optical and infrared data will be used to study –

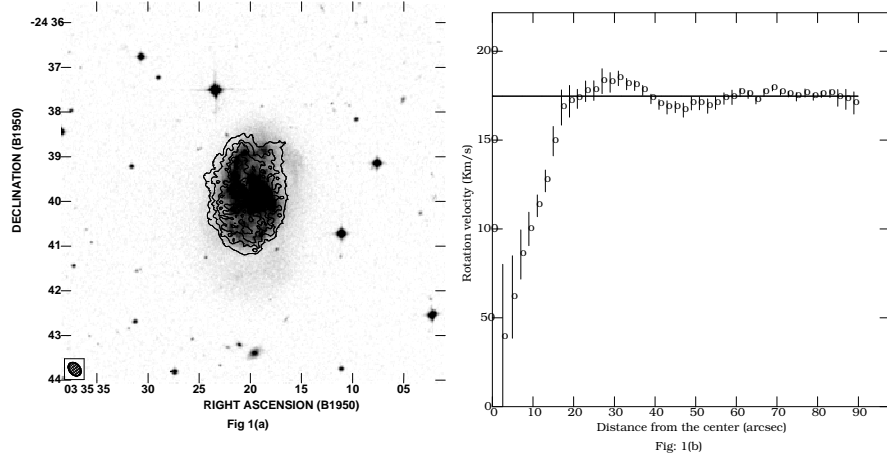
1. Rotation curves of the disk galaxies
2. Tully-Fisher relation using rotation curve and 2MASS magnitudes
3. M/L ratios and dark matter haloes of the disk galaxies
4. Star formation rates in the disk galaxies
5. Radio continuum morphology and spectral indices of galaxies

## 3. Results

We have observed 26 pointings, each with a field of view of  $\sim 24'$ , using the GMRT and most of the data have been analysed. Further observations are proposed with the GMRT. The HI image and the rotation curve of NGC 1385, a member of this group, are shown in figure 1.

## References

Willmer, C. N. A. et al., 1989, *Astron. J.*, **98**, 1531.



**Figure 1.** 1(a). The HI column density contours of NGC 1385 are shown overlaid upon the DSS image. The contour levels are 1, 3, 5, 7, 9 in units of  $4.0 \times 10^{20} \text{ cm}^{-2}$ . The HI mass is  $2 \times 10^9 M_{\odot}$ . The synthesised beam ( $20'' \times 14''$ ) shown in the lower left corner corresponds to a resolution of  $\sim 1 \text{ kpc}$ . 1(b). Rotation curve of NGC 1385 constructed using the HI velocity field. The velocity resolution is  $\sim 13 \text{ km s}^{-1}$ .  $1'$  corresponds to a linear distance of  $\sim 5 \text{ kpc}$ .