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DARK MATTER HALOES IN ISOLATED INTERACTING GALAXY PAIRS

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Most of the studies attempting to characterise the mass-to-luminosity ratio (M/L) and the structure of dark matter haloes in isolated interacting galaxy pairs have used a statistical approach of the problem. It is important though to restrain these parameters through the detailed observations and analysis of the kinematics and dynamics of specific interacting galaxy pairs. We present results on the preliminary study of the M-51 type interacting galaxy pair Kar302 (NGC 3893/96).

Kar 302 (NGC3893/96) is an interacting galaxy pair in which the main galaxy (NGC3893) is an Sc grand design spiral galaxy similar to NGC 5194 in M51 while the small companion seems to be an irregular galaxy. This pair was observed with the 2.1 m telescope at the Observatorio Astronómico Nacional in San Pedro Mártir (México) using the scanning Fabry-Perot interferometer PUMA (Rosado et al 1995).

The velocity field and the rotation curve of NGC 3893 were obtained from the observation of the redshifted nebular H_α line emission using the ADHOC software.

In order to adjust a mass model to the rotation curve of this galaxy, the H_α kinematical information was complemented with HI synthesis observation by Verheijen & Sancisi (2001). The superposed curves are shown in Figure 1.

We tried to adjust different mass models to the observed rotation curve. These models (Blais-Ouellette 2000) consider the light distribution of stars, the HI surface density and a theoretical dark matter halo (isothermal or NFW) in order to compute a resulting rotation curve that best fits the observed points. For NGC3893, optical photometry was taken from Hernández-Toledo & Puerari (2001) and the HI distribution from Verheijen & Sancisi (2001). We tried to fit the observed rotation curve using either a maximal or a non-maximal stellar disk and with both an isothermal and a NFW halo (Figure 1).

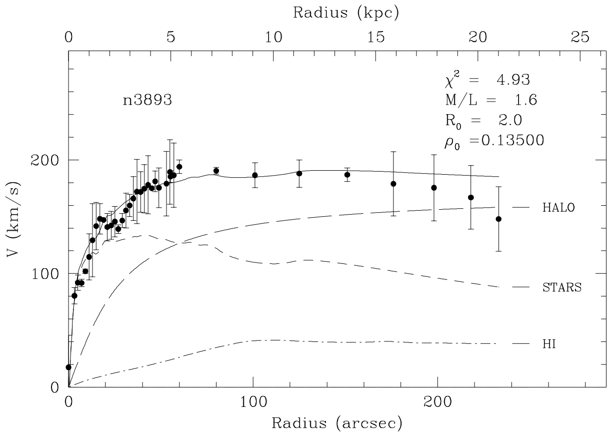

Fig. 1. Multi-wavelength rotation curve for NGC3893.Inner points correspond to H_{alpha} observations, outer points correpond fo HI observations. A maximal disk model and a NFW halo was used to fit the observed rotation curve.

We find that the observed H_α curve imposes restrictions on the mass model considered so that the parameters obtained with a maximal disk assumption on the H_α points differ from those obtained only with the HI curve. The choice of a classical halo model (isothermal or NFW) was unable to properly fit the outer parts of the HI curve. This could be explained either by a truncated halo for NGC 3893 or by considering a common halo for both galaxies due to their interacting nature. A third explanation could be that the tilted-ring fit for the HI curve needs to be revised. Future work will encompass numerical simulations of this type of encounter varying the M/L and halo structure in order to reproduce the observations.

The adhoc software can be retreived from http://www-obs.cnrs-mrs.fr/adhoc/

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