

THE HI HALO OF NGC 891

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NGC 891 is a spiral galaxy very similar to our Galaxy, almost perfectly edge-on ($i \simeq 89^\circ$) and nearby ($D = 9.5$ Mpc). For these reasons it has become a key system for the study of the vertical distribution of the interstellar medium in a spiral disk.

Here we discuss two results from new, very sensitive WSRT observations of NGC 891. The HI image shows faint HI emission extending up to several kpc on both sides of the plane. The data have been analysed using three-dimensional modeling to test the effects of inclination, outer flaring, warping or combinations of these. Initially we have assumed that the gas at large z heights rotates with the same velocity as the gas in the plane. But none of these models has given a satisfactory description of the observations. Subsequently, a model has been tried with a two component structure: a thin disk rotating according to the derived rotation curve, and a thick disk rotating 25 km s^{-1} more slowly. This model reproduces the observations very well. From this we conclude that: 1) there is gas in the halo of NGC 891 and 2) this gas has a slower rotation than that in the plane.

The position velocity map shows the presence of emission at high positive and negative velocities near the center. Its kinematics and distribution suggest a fast rotating disk or ring of gas ($v_{rot} = 230 \text{ km s}^{-1}$) coplanar with the galaxy disk with a radius of approximately 700 pc and unresolved in the z direction by the $12''$ beam. The thickness of the disk must therefore be much less than 500 pc. This seems to be the HI counterpart of the rotating nuclear CO disk already discovered by Sofue (1987). Its estimated HI mass is $1 \cdot 10^7 M_\odot$, with a factor of two uncertainty. This is significantly less than the amount of molecular gas ($2 \cdot 10^8 M_\odot$, García-Burillo et al. 1992).

References

- Sofue, Y., Nakai, N., Handa, T., 1987, PASJ **39**, 45
García-Burillo, S., Guélin, M., Cernicharo, J., Dahlem, M., 1992, A&A **266**, 21