

MASS/LUMINOSITY RATIOS FROM ROTATION OF HI IN S0 GALAXIES

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At Westerbork, we have mapped the distribution and motions of HI in about twenty gas-rich S0 and S0/a galaxies, with resolutions of order 30 arcsec. Gas-rich S0's often have most of their HI in an outer ring, with diameters between 0.9 and 2.5 times the optical (D_0). Assuming circular shape and motions for this ring, radius R , and a spherical distribution of matter, we derive the inclination and rotation speed of the ring, the amount of mass $M_T(R)$ interior to it and the corresponding ratio M_T/L_B^0 to blue luminosity.

Gas-rich S0/a's often have (partly) filled HI disks, and SB0/a's tend to have broad outer rings or sets of arms around big central holes

Figure 1 shows 4 rotation curves so obtained. The S0 NGC 4203 has an inner and outer HI ring (Van Woerden et al. 1983), which together give a flat rotation curve. The disk and the broad rings in NGC 3900 (SAr0⁺) 3941 (SBs0/a) and 5101 (RSB0/a), respectively, give flat, rising and falling rotation curves, though the latter is uncertain because of its low inclination. Figure 2 shows rotation speeds V_{rot} at outermost (radius R_{max}) in 13 S0 and S0/a galaxies. There is only a marginal trend for V_{rot} to increase with R_{max} , due to 2 dwarfs and one supergiant galaxy. The trend (and the fit) is, however, consistent with the relation between diameter $A(0)$ and corrected profile width $\Delta V(0)$ found by Shostak (1978).

A plot of M_T/L_B^0 vs. linear HI extent R_{max} shows no significant trend. Figure 3 does suggest a trend for M_T/L_B^0 to increase with the ratio R_{max}/R_{opt} , where $R_{opt} = \frac{1}{2}D_0$. At any rate, our data suggest a wide range of mass/luminosity ratios in S0 galaxies.

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References

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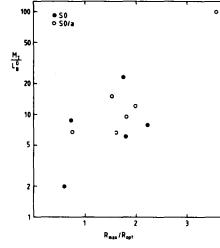
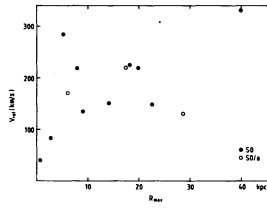
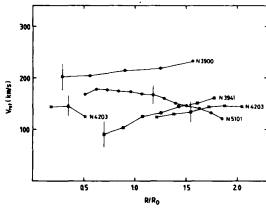


Figure 1 (left): Rotation curves for 4 S0 and S0/a galaxies.

Figure 2 (middle): Rotation speed vs. HI extent for 13 S0's and S0/a's.

Figure 3 (right): Mass/luminosity ratio vs. HI extent/optical size.