

HUBBLE TYPE DEPENDENCE IN THE TULLY-FISHER RELATIONSHIP

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Data from 60 field spiral galaxies shows that the Tully-Fisher (TF) relationships,  $M_B$  vs.  $\log(V_{max})$  and  $\log(D_{kpc})$  vs.  $\log(V_{max})$ , are both Hubble type dependent and that the slope in the  $M_B$ - $\log(V_{max})$  correlation is steep,  $\sim 10$ .

Our study, conducted in collaboration with W.K. Ford, Jr. and D. Burstein, is principally aimed at elucidating the intrinsic range of properties of spiral galaxies. Hence, we picked a sample of 21 Sc's, 23 Sb's and 16 Sa's with the widest range in luminosity and radius we could find at each Hubble type. Type classifications come principally from Sandage and Tammann (RSA); a few from de Vaucouleurs *et al.* (RC2) and Nilson (UGC). We stress that this is not a volume limited sample; the end members in the luminosity or radius range of the galaxies at each Hubble type are quite rare.  $V_{max}$  comes from the maximum observed optical rotation velocity. We also have 21-cm profiles for all Sc's, 2/3 of the Sb's and 1/2 of the Sa's; the result remains the same whether  $V_{max}$  comes from 21-cm profiles or optical rotation curves. But note,  $\sim 1/3$  of the Sa galaxies observed were undetectable at 21-cm. This must introduce a bias in the infrared 21-cm TF results. Magnitude corrections come from Heiles and Burstein (1978), but corrections from the RC2 give the same result. We currently have data for 8 galaxies in the Pegasus I and Cancer clusters, which are also consistent with the results shown below.

Figure 1. (Left) The correlation of absolute magnitude with maximum rotational velocity for Sc, Sb and Sa field galaxies. For clarity, only the Sc and Sa data are plotted. The lines are mean least squares regressions to the correlation of  $M_B$  on  $\log(V_{max})$  and  $\log(V_{max})$  on  $M_B$ . (Right) The correlation of  $\log(D_{kpc})$  with  $\log(V_{max})$ .

