RESULTS OF A RADIO CONTINUUM SURVEY OF SPIRAL GALAXIES AT 10.55 GHz

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The *Revised Shapley-Ames Catalog* (Sandage & Tamman, 1981) contains 335 spiral galaxies brighter than $B_T = 12$. A subsample of these galaxies with $\delta \geq -25°$ and total flux densities at 1.49 GHz (Condon, 1987) above 10 mJy were observed at $\lambda 2.8$ cm using the 100-m radio telescope of the MPIfR Bonn. Depending on the expected flux density and extent of the source two observational methods were used: cross-scanning and mapping. In total, radio flux densities of 192 galaxies have been derived (Niklas *et al.*, 1995). Additionally, a literature search was made in order to get flux densities at other frequencies.

One can separate the thermal and non-thermal emission by fitting to the radio spectra of a galaxy an optically thin thermal component with a spectral index of -0.1 and a synchrotron component with a spectral index α_{nth}. The fit parameters are the thermal fraction f_{th}^{1GHz} at 1 GHz and the non-thermal spectral index α_{nth}. The mean values of the derived distributions are: $\overline{f_{th}^{1GHz}} = 0.07 \pm 0.01$, $\sigma = 0.05$ and $\overline{\alpha_{nth}} = 0.85 \pm 0.02$, $\sigma = 0.12$. The thermal fraction seems to be independent of morphological type. The left diagram of Fig. 1 shows the distribution of α_{nth}. Sa and Sab galaxies and some irregular galaxies tend to have flatter spectra than Sb/Sc galaxies.

A test of the separation of thermal and non-thermal emission was made. We have calculated the flux density of the thermal radio emission at the corre-

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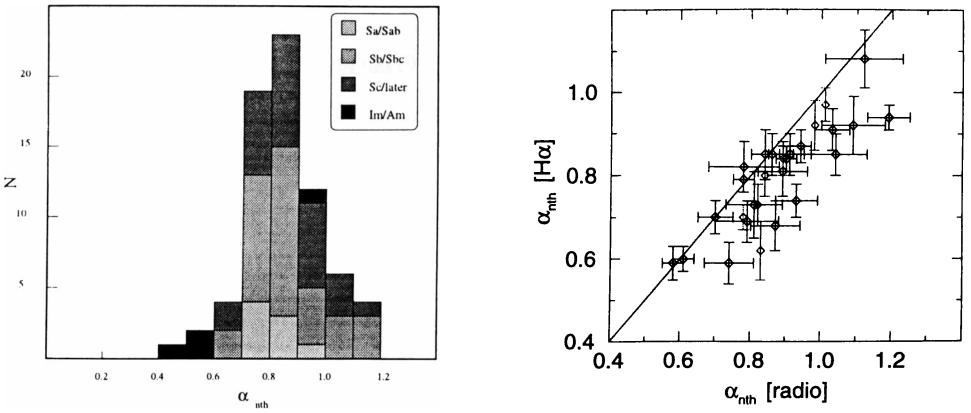

Figure 1. **The left diagram shows the distribution of the derived α_{nth}. The different grey scales represents the morphological types. The right diagrams shows the plot of $\alpha_{nth}^{H\alpha}$ versus α_{nth}^{radio}. The solid line corresponds to perfect agreement.**

sponding frequencies using the Hα data of Kennicutt & Kent (1983). These thermal fluxes were subtracted from the composite radio spectra. We fitted a power law to the residual spectrum in order to derive the non-themal spectral index $\alpha_{nth}^{H\alpha}$. The right diagram of Fig. 1 shows $\alpha_{nth}^{H\alpha}$ versus α_{nth}^{radio}. There exists a good correlation between the derived quantities. The shift towards flatter $\alpha_{nth}^{H\alpha}$ may be due to optical absorption in the host galaxies.

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