

# DEMOGRAPHICS OF NUCLEAR ACTIVITY IN NEARBY GALAXIES

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## 1. The Palomar Survey of Nearby Galaxies

Between 1984 and 1990 we conducted a survey at Palomar Observatory (Filippenko and Sargent 1985) to quantify the luminosity function of nearby active galactic nuclei (AGNs). The Hale 5 m telescope was used to obtain high-quality, moderate-resolution optical spectra of a nearly statistically complete sample of about 500 bright ( $B_T \leq 12.5$  mag), northern ( $\delta > 0^\circ$ ) galaxies (see Ho *et al.* 1995 for details). The survey has now been completed, and the first scientific results are reported in a series of papers by Ho *et al.* (1997a, b, c).

## 2. Highlights

Some of the key findings are as follows.

1. AGNs are very common in nearby galaxies (Fig. 1). At least 40% of all galaxies brighter than  $B_T = 12.5$  mag show spectral signatures of nuclear “activity” of probably nonstellar nature. The emission-line nuclei are classified as Seyferts, LINERs, or LINER/H II-region composites, and most have very low luminosities in comparison with traditionally studied AGNs. The luminosities of the H $\alpha$  emission line range from  $10^{37}$  to  $10^{41}$  ergs s $^{-1}$ , with a median value of  $\sim 10^{39}$  ergs s $^{-1}$ .

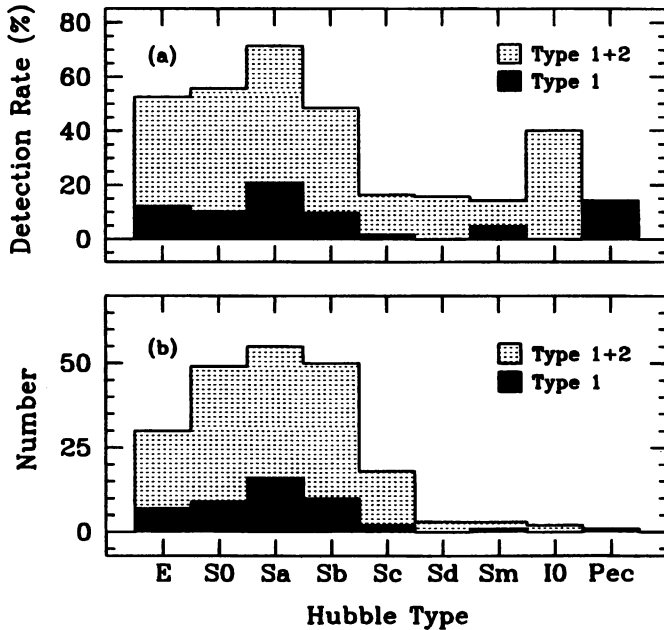


Figure 1. (a) Detection rate and (b) number distribution of AGNs as a function of Hubble type in the Palomar survey. “Type 1” AGNs (those with broad  $H\alpha$ ) are shown separately from the total population (types 1 and 2).

2. The detectability of AGNs depends strongly on the morphological type of the galaxy, being most common in early-type systems (E–Sbc).

3. LINERs make up the bulk (2/3) of the AGN population and a sizable fraction (1/3) of all galaxies.

4. We found a significant number of nuclei showing a faint, broad (FWHM  $\approx 1000\text{--}4000 \text{ km s}^{-1}$ )  $H\alpha$  emission line that qualitatively resembles emission arising from the conventional broad-line region of “classical” Seyfert 1 nuclei and QSOs. About half of these “type 1” AGNs are formally classified as LINERs. This furnishes strong evidence that at least some LINERs are indeed genuine AGNs.

## References

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