Abstract. High surface brightness galaxies are also galaxies with high star-forming activity. About a half of them omit, on the average, twice as much energy in the IR than in the blue. The rates of star formation are 10–30 times higher than those in normal galaxies. On average 100–300 solar masses gas are converted into stars every year and 10–30 are massive stars.

1. Introduction

Recently Petrov (1986) published a list of 47 new high surface brightness galaxies in the Nilson (1973) system of diameters. The criteria for their choice was as in Arakelian (1975): namely, surface brightness \( \bar{B} \geq 22m_p \) angl. s\(^{-2} \), where \( \bar{B} \) is defined by

\[
\bar{B} = m_p - 0.25 \cos e c i b^H I + 2.5 \log \left( \frac{3.14 D \times d}{4} \right) + 0.22D/d + 0.73 .
\]

Petrov (1986) showed that with the Nilson’s system of diameters this criteria is more stringent – only 24\% of all 193 Arakelian galaxies included in the UCGC are HSBG in the Nilson system. In spite of the galaxies are relatively bright (only two are with \( m_p > 14.5 \)) they are insufficiently studied. For about 20 of them it was taken spectra with dispersion 50 A \( \text{ram}^{-1} \) on the 2-m telescope of the National Astronomical Observatory in Rozhen, Bulgaria. The results will be published at a later time.

The IRAS data allow as to make a general study of the star burst activity in this type of galaxies.

2. The Results

Out of total 47 HSBG in the Catalogue of Galaxies and Quasars detected in the IRAS Sky Survey, 1985 are included 25 (53\%) objects. This is comparable with the percentage of the active galactic nuclei with the far-infrared fluxes from the IRAS (58\%), and is more significant than those for the Sy 1G, LINERs and Markarian galaxies (ca. 40\%) or Akn G (32\%). Only this fact is an evidence for the higher star burst activity in this galaxies.

In Table I we present accordingly the number of the object (Petrov, 1986), the magnitude \( m_p \) in the Zwicky system, the redshift \( z \), the densities of the IR fluxes at 12,
TABLE I

Far-infrared characteristics of high surface brightness galaxies

<table>
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<tr>
<th>No.</th>
<th>m_p</th>
<th>z</th>
<th>S_{12}</th>
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<th>log L_{FIR}</th>
<th>log L_B</th>
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25, 60, and 100 mkm in Jy, the temperature indices $S_{12/25}$ and $S_{60/100}$, the luminosities in the far-infrared $L_{FIR}$ and in the blue $L_B$ in erg s$^{-1}$ and the infrared excess index $C_{FIR} = F_{FIR}/F_B$.

According to the calibration of the IRAS data (see Catalogued Galaxies, 1985) $F_{FIR} = 1.26 \times 10^{-14} (2.58 S_{60} + S_{100})$ W m$^{-2}$ and $L = 4\pi d^2 F$, where $d$ is the distance to the galaxy. The luminosities and the fluxes $F$ in the $B$-region are determined by Zwicky's magnitudes without the corrections proposed by Sasano (1985). Following Houck et al. (1984) $\log F_B = -7.54 - m_p/2.5$ W m$^{-2}$. With this calibration the fluxed in $B$ are about 5 times higher than those determined by the standard reaction of the $B$-filter (see Soifer et al., 1987).

It is seen from the data in Table I that far-infrared luminosities are $L_{FIR} = 10^{43}$--$10^{45}$ erg s$^{-1}$. It is the same for the luminosities in the blue. A total of 11 (44%) objects emit more energy in the far-infrared than in the blue. For two objects (Nos. 604 and 608) $F_{FIR} \approx F_B$ -- i.e., about the half of the HSBG have FIR fluxes comparable or higher than the blue ones.

Figure 1 present the 'two-colour' diagram $\log S_{60/100} - \log S_{12/25}$ for the 25 HSBG with measured IR fluxes. The straight lines restrict the region of the 'normal' galaxies,