CLASSIFICATION SCHEMES AND PROPERTIES OF INFRARED GALAXIES

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1 OUR SAMPLE

We used data from the point source catalogue called FIS which was created from observations made by AKARI satellite at four far-infrared wavebands. First we made a plot like the one to the left with distribution of 100 µm emission of dust in our Galaxy at position of each source. The high peak corresponds to sources in Galactic plane; the small one consists of sources outside it. We chose sources at areas where dust emission was lower than 10 MJy/sr. There were identified in NED and SIMBAD databases. As a result we get mainly extragalactic sources, some Galactic sources and others of unknown origin. Quite a lot haven’t been identified.

2 STAR-GALAXY SEPARATION

We’ve shown, for sources from β-1 version of FIS catalogue, that in all combinations of FIR colour-colour diagrams we can distinguish two separate clouds. We decided the division line between those clouds. And one of the clouds contains in all cases almost only galaxies, the other one generally consists in stars. The figure shows scatter plot for sources with best quality fluxes from first version of FIS catalogue. Red squares are galaxies, blue triangles are stars. The solid line is a division line and dashed lines are error lines of calculating the division. The plot proves that the separation lines are valid.
3 GALAXY SAMPLE

Galaxy sample

- in the sample there is 27,384 galaxies; nearly 68% of galaxies have their redshift measured and practically all of them are located at low redshift below 0.1 (95th percentile is about this value).
- morphology was obtained for just over one third (34%) of galaxies.

<table>
<thead>
<tr>
<th>Type of galaxies</th>
<th>Number in IR</th>
<th>Percentage number in IR</th>
<th>Percentage number in opt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiral</td>
<td>7877</td>
<td>85%</td>
<td>61%</td>
</tr>
<tr>
<td>Lenticular</td>
<td>911</td>
<td>10%</td>
<td>22%</td>
</tr>
<tr>
<td>Irregular</td>
<td>161</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Elliptical</td>
<td>268</td>
<td>3%</td>
<td>13%</td>
</tr>
<tr>
<td>All</td>
<td>9217</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Closer look at galaxy sample reveals that they are mainly located in the local universe. And in infrared we see different morphological distribution of galaxies than in optical wavelengths. We see much more spiral galaxies, very little elliptical galaxies, comparable amount of irregular galaxies and still quite a lot of lenticular galaxies.

4 HOW FIR COLOURS VARY WITH HUBBLE SEQUENCE?

How FIR colours vary with Hubble sequence

- medians of FIR colours change only slightly along Hubble sequence.
- spiral galaxies of type Sc have smallest median for each FIR colour.
- if we neglect morphological types for which there is very poor number of objects e.g. Sm then difference between highest and lowest values of median (indicated in table in red) are 0.1, 0.24, 0.27, 0.15, 0.24, 0.02 and also lenticular galaxies have the highest median for almost all colours. Median of \( \log(S_{140}/S_{160}) \) is almost the same for all morphological types because 140 \( \mu m \) and 160 \( \mu m \) wavebands lie very close to each other and it is very possible that both are at the Rayleigh-Jeans regime of dust emission. First rough conclusion, from all these observations, can be that lenticular galaxies contain more hot dust than Sc galaxies.