
Abstract

This work details the investigation, presentation and analysis of the Near Infra-red Luminosity Function for the 2PASS galaxy catalogue, which is a catalogue of galaxies and groups component to the Two-Degree Percolation Inferred Galaxy Group (2PIGG) catalogue with near infra-red detections in the Two-Micron All Sky Survey (2MASS) galaxy catalogue. The 2PASS catalogue was then subjected to a number of lines of investigation to observe any obvious selection effects; it was found that there was a lack of bimodality in the (B-R) colour distribution, with the bluer galaxies being under represented in the catalogue due to the selection preferences of the 2MASS system of collection (i.e. being bright in NIR). The (J-K) was found to be relatively insensitive to galaxy type, as is to be expected. A Schechter function analysis, with various selection criteria, was then carried out upon the 2PASS catalogue to see how the different masks by which the sample was chosen affected the shape of the faint end slope of the B, J and Ks (hence mass) band functions (the mass function was inferred from the Ks-band through a constant $^{mass}/_{light}$ ratio). The selection criteria were (i) Selection by group Size, (ii) Selection by B-band Group luminosity and (iii) Selection by K-band luminosity [mass]. These selection masks had further smaller levels of aggregation in that each criterion had three component masks of *large*, *medium* and *small*. The group size and K-band luminosity were found to follow the ‘Expected Split-Shift Effect’ (ESSE), which is where large/bright groups contain mainly massive/bright galaxies, with the converse being also true, the parameters found reflected previous works. The selection by B-band functions followed the ‘Contradictory Split-Shift Effect’ (CSSE). This is where the bright B groups were dominated by fainter galaxies with the converse also being true. Reasons for these two effects and the respective causes were discussed. The northern 2PASS catalogue depth was then increased through the addition of UKIDSS galaxies to the 2PASS data set; this new catalogue was called the 2PASSUK. The NIR functions for all three selection criteria generally followed the ESSE, the B-band functions followed the ESSE for selection by Group Size and L_K but for selection by L_B it followed the CSSE. The dwarf to giant ratio was then calculated for the 2PASSUK-All Sky catalogue, which comprises of 2PASSUK for the north and 2PASSXPS (2PASS catalogue comprising of both Point and Extended sources) for the south. For a stated K-band magnitude range of; $-19.5 > Dwarf > -22.5$ and $-22.5 > Giant > -25.5$, the DGR was found to increase logarithmically with steepening faint end slope.