THE SOUTHERN DEEP NEAR INFRARED SURVEY (DENIS)
A PROSPECT OF PN EXPLORATION

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Abstract. The near infrared light is important for the exploration of proto-planetary nebulae as well as for the planetary nebulae in early phases (Persi et. al. 1986, in Planetary and Proto-Planetary Nebulae: From IRAS to ISO, ed A.P.Martinez). Numerous work on the fluxes of the well known planetary nebulae was already done in the late 80's, but a sky survey will give a large sample of data to provide more detailed statistics.

The present work presents an overview of the data on planetary nebulae expected from the European project of a deep near infrared survey of the southern sky (DENIS) (IAP and DESPA Paris, Heidelberg, Leiden, IAC Tenerife, Grenoble, Lyon, Frascati, Innsbruck, Vienna) in the I, J and K band with a limiting magnitude of 14.5 to 15 for point sources and 17 mag arcsec^{-1} for the surface brightness. The angular resolution for identification of non–point source objects will be about 5".

The number of PNe in the survey

The problems of such calculations are the numerous assumptions on the space density, the average size and the average brightness of the objects. Assuming an average size of 0.2 to 0.5 pc (moderately bright surface) we attain up to 20 kpc as the distance of visibility of the PNe. Using a space density and radial scale factor determined by known objects we obtain a total number of PNe of approximately 2.10^4 objects within this area. Assuming a 'determination efficiency' of 30% we get 6.10^3 sources.

But due to the lack of extinction in these bands, the density estimates might have to be corrected heavily. Therefore the total number of candidates in the sample might increase by a factor of 10. Smaller sources might be filtered from the stellar sources by color–color diagrams. This might give an extra contribution to the sample.

The IR data for already known PNe

Since the survey gives very accurate positions the crossidentification to objects of other catalogues will be possible almost 'online' while the survey is running. This will lead to numerous new data on the known objects. In particular statistics on hot dust properties in different stages of evolution can be done easily.

The central stars of PNe

The IR photometry of the central stars is mainly of interest for a more accurate determination of the extinction of these objects and better estimates of the Plank curves of the photosphere.

Assuming an average absolute magnitude of $M_V \approx 5^m$ and an intrinsic color index similar to a O5V star (Scheffler & Elsässer, 1974) we get 1 kpc as a distance of visibility of the objects.

References

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