

NEAR INFRARED PHOTOMETRY OF COMPACT PLANETARY NEBULAE

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ABSTRACT. The study of young planetary nebulae can provide information about the ejection process of the nebular material as well as on nebular evolution and the enrichment of the interstellar medium. The youngest PN are expected to be compact and very dense, they usually show signs of variability and IR excess due to the presence of warm dust which, in some cases, seems to be mixed with the ionized gas.

We have started an extensive program to try to obtain IR data of a large sample of PN. We are interested in investigating a set of young, compact, high density PN in order to study their general characteristics that will help us understand better the infrared emission mechanism and their evolution.

In this work, we present JHK photometry for more than 30 compact ($\phi < 10''$) planetary nebulae, which have been obtained with the infrared photometric system at the 2.1-m telescope of the Observatorio Astronómico Nacional in Baja California.

The unreddened colors $(J-H)_0$ and $(H-K)_0$ have been determined for all the objects with $E(B-V)$ available.

From these data we find:

- 1) In the color-color diagram the PN are grouped in an area about $(J-H)_0 = -0.51$ and $(H-K)_0 = +0.68$.
- 2) High density nebulae ($\log N_e \geq 4$) have an excess in the mean value of $(H-K)_0$ over low density objects.
- 3) Most high density nebulae show an IR excess in H and K filters over the expected free-free emission that is not present in low density objects. This excess is interpreted as due to warm dust in the high density (younger) objects.
- 4) A good correlation of the $(J-H)_0$ color with the He^+ ionic abundance is found. This is due to the He^+ 1.08 μm emission line which is included in the J band.