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INTRODUCTION

While the number of known Planetary Nebulae (PNe) is about 3000, predictions suggest numbers up to $28\,000 \pm 5000$ (Frew & Parker, 2006). This indicates that a large fraction of PNe are missing. One of the main observational problem is the high extinction mainly located towards the Galactic Center and at low Galactic latitudes in the Plane.

The INT photometric H-alpha Survey (IPHAS) is a tool that will actually help us in finding those "hidden" PNe (Drew et al. 2005). Indeed this project which maps the Northern Hemisphere is operating at the latitude range $-5^\circ < b < 5^\circ$. Our goal is therefore to increase the number of known PNe in the Plane for a better census and a better understanding of the whole PN population.

We present here an investigation focusing on the strip between right ascension 20h and 21h.

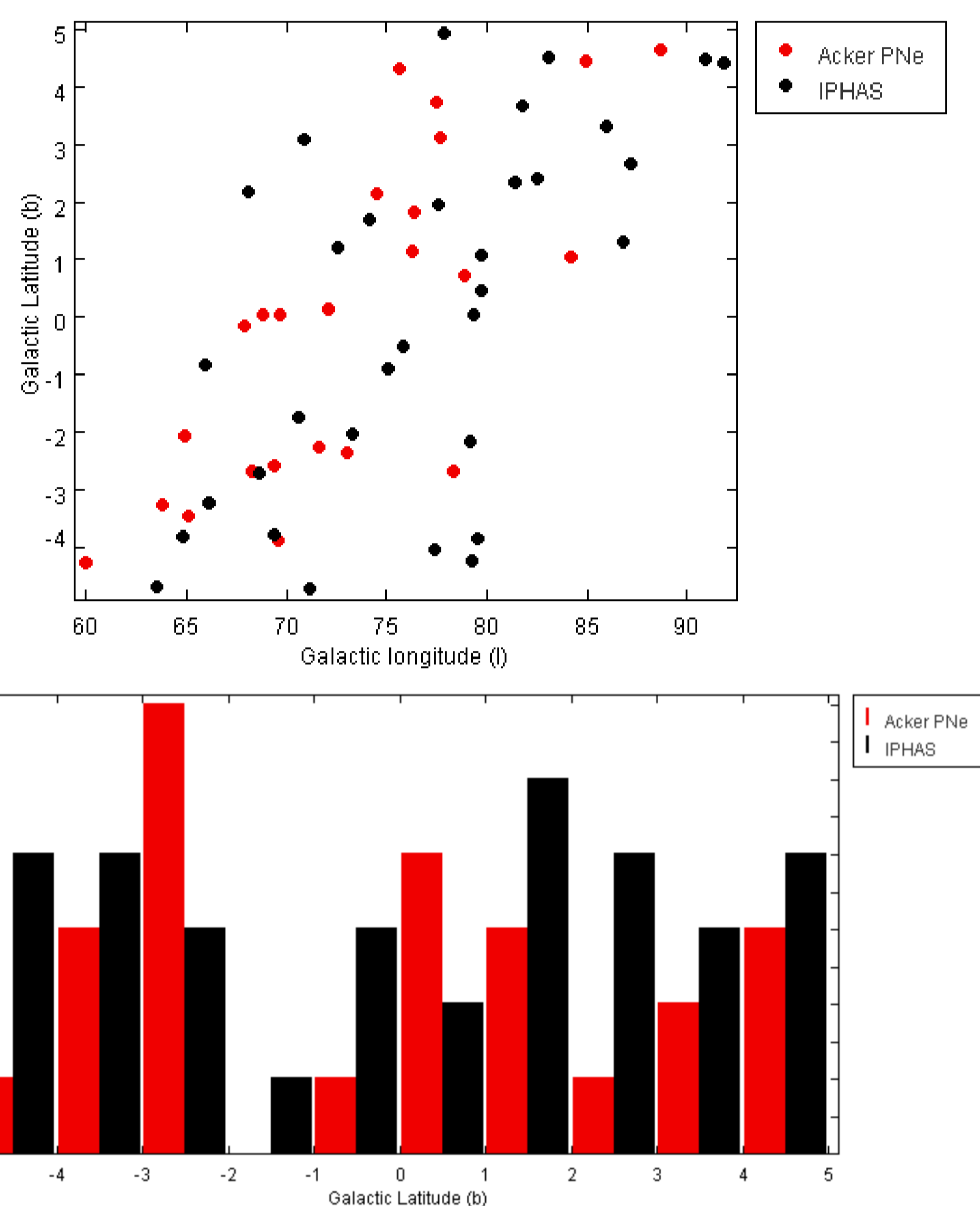


Fig.1 Top: Distribution of the Group I PN candidates vs the PNe from Acker et al. (1992). Bottom: Histogram showing the completion brought by IPHAS in terms of latitude coverage.

RESULTS

a) PN Candidates Detection

The visual search led to 66 PN candidates that were divided into three groups (I, II & III) ranging from very likely to less likely PNe. The divisions are mainly based on the candidates morphology and the comparison of their $H\alpha, r, i$ colours. As a result, 33 objects were classified in group I and are therefore the first ones to be investigated. Also 18 candidates were selected to be in group II and 15 in group III.

The statistical investigation presented in this poster concerns the objects of group I. Their distribution in the Galactic Plane (l, b) is shown in Fig.1-Top as well as an histogram view of the latitudes distributions (Fig.1-Bottom). For comparison purposes, both graphs also include known PNe from the ESO-Strasbourg Catalogue (Acker et al. 1992) located in the exact same regions. **Our work shows that with IPHAS not only do we increase the number of objects but we also have a better coverage at low latitudes in the Plane where the extinction is higher.**

The morphological analysis of our 33 candidates indicates a larger number of Round nebulae: 40% (they also represent 38% of the whole sample of 66 objects, see Fig.2).

The other morphological classes found in Group I are 27% Elliptical and 33% Irregular. Interestingly, no new bipolar object was detected! However, we emphasize that this classification is made using the 120s $H\alpha$ exposure images from the survey: we are therefore limited in the "accurate" description of the PN candidates morphology.

b) Spectroscopic identification

We present four spectra obtained at SPM in Fig.3. The combination with the new diagnostic diagrams by Frew et al (2010) y Sabin et al (2013) allowed us to identify all four objects as bona fide Planetary Nebulae. Following the IPHAS nomenclature and the ID flags set by Parker et al. (2005) we classified the following new IPHAS objects as true PNe: IPHASX J195400.8+315555, IPHASX J200937.3+242903, IPHASX J204414.2+360737 and IPHASX J205002.9+375315

METHODS

Our work consisted of a visual search for extended and well defined/detached structures in 165 $2^\circ \times 2^\circ$ $H\alpha-r$ mosaics made from IPHAS data. We used exclusively a 15×15 pixels binning ($\sim 5''/\text{pix}$). We underline that stellar (point-source) objects were not selected during our search. A subsequent spectroscopic follow-up was realised with the 2.1m telescope and the Boller & Chivens spectrograph at the San Pedro Mártir Observatory, to identify the new nebulae. This run, which took place between 6-9 of May 2013 allowed observations of a couple of candidates. Our detection and identification results are presented in the following section.

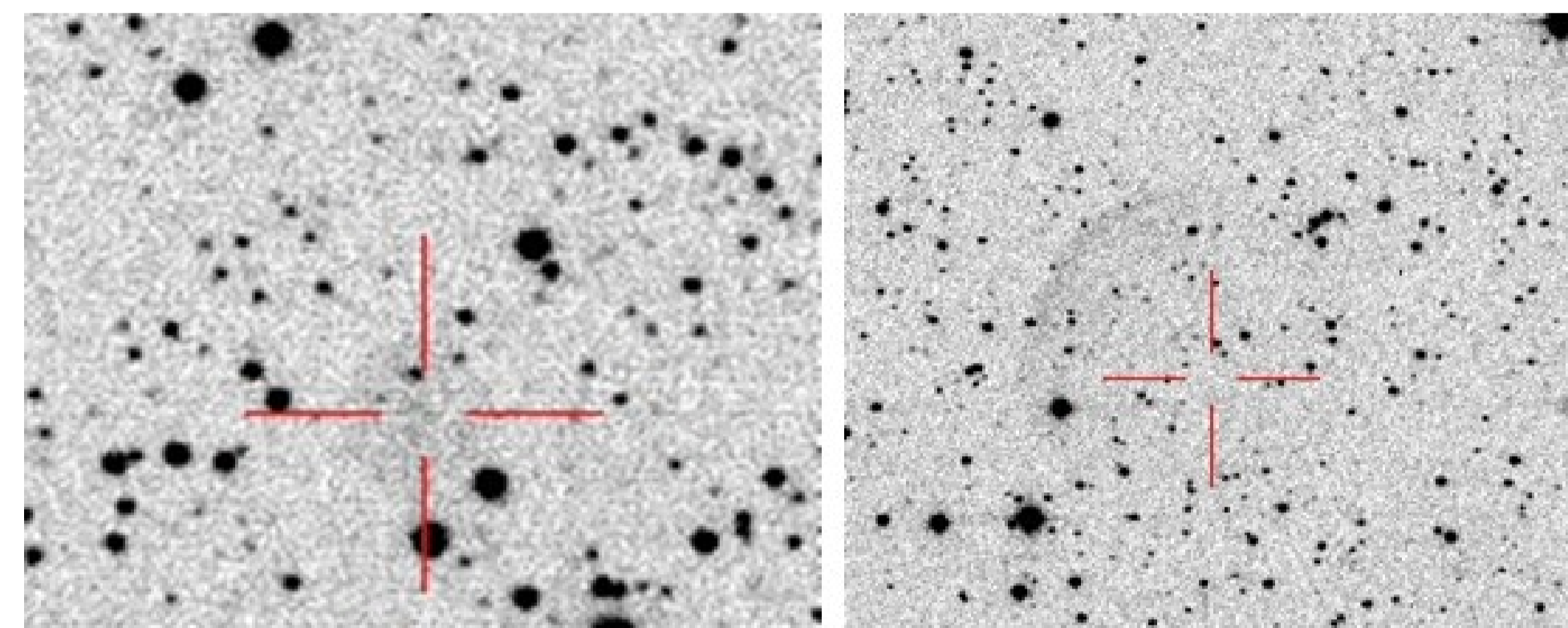


Fig.2 Example of round PN candidates discovered while scanning the 20h-21h IPHAS sky area.

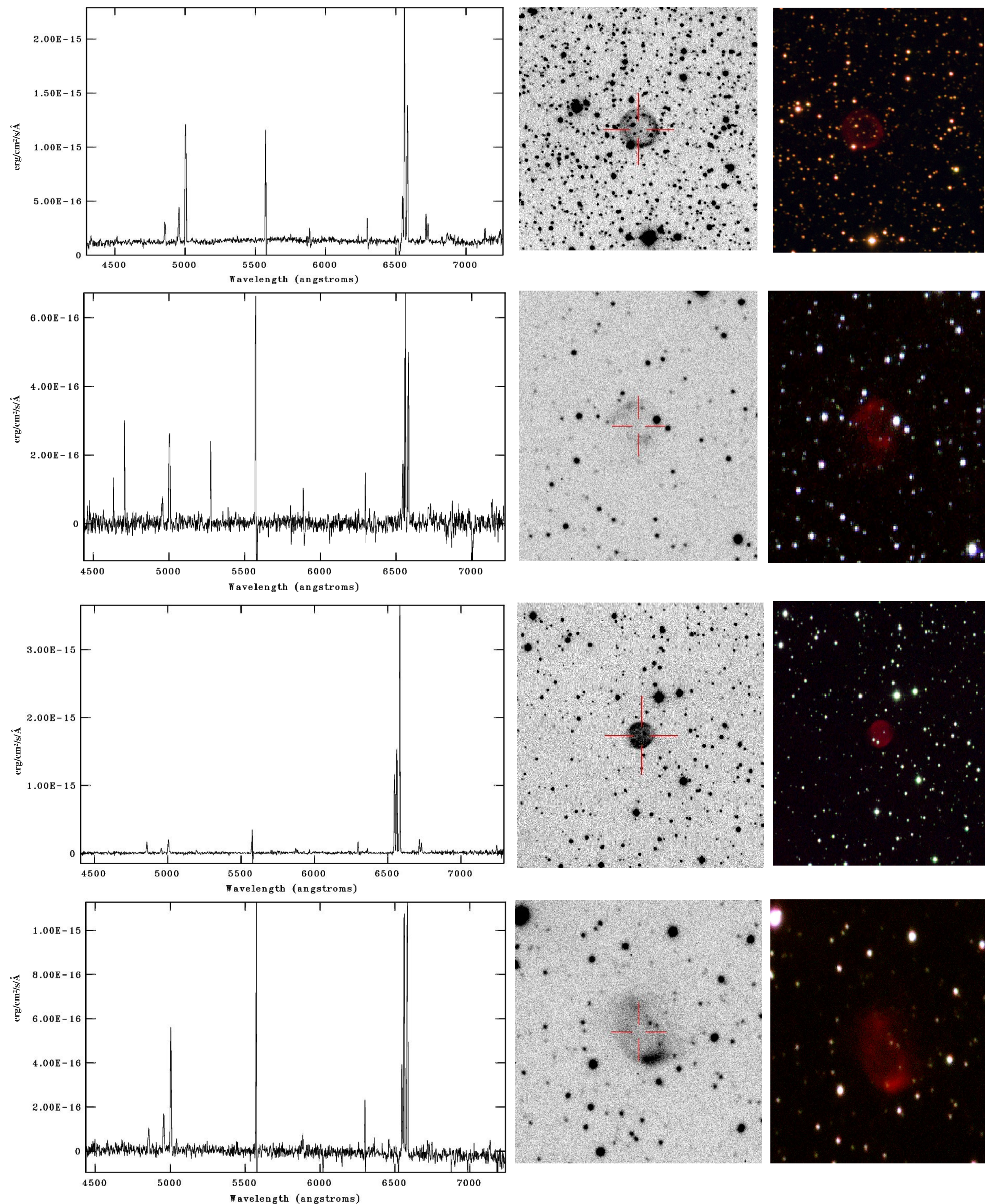


Fig.3 SPM spectra of four Group I confirmed PNe with on their associated $H\alpha$ (middle panel) and RGB (Red: $H\alpha$, Green: I, Blue:r) images. From top to bottom: IPHASX J195400.8+315555, IPHASX J200937.3+242903, IPHASX J204414.2+360737 and IPHASX J205002.9+375315

CONCLUSIONS

After scanning the Galactic Plane between RA=20h-21h in the "IPHAS sky" we found several new PN candidates, 33 of which are classified as most likely PNe based solely on their morphology. And, a large number of round objects are uncovered in these zones of heavy extinction. We present the spectroscopic investigation which led to the confirmation of four bona fide PNe. It is clear that more PNe are present and still need to be spectroscopically investigated, and this will be the theme of a future work.