

An integrated H α flux atlas of planetary nebulae in the Magellanic Clouds: Combining S-PLUS photometry and spectroscopic analysis

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This study presents an atlas of H α + N II fluxes for Magellanic Cloud Planetary Nebulae (MC PNe) using S-PLUS imaging and spectroscopic data from the literature. Our methodology generated H α + N II flux maps for numerous MC PNe, emphasizing method reliability through spectroscopic-photometric comparisons. Visual representations showcased S-PLUS data fidelity in capturing spectral features. Ongoing work addresses refinements in analysis techniques and broader applications of these flux maps for distance and temperature calculations.

Southern Photometric Local Universe Survey (S-PLUS; Mendes de Oliveira et al. (2019)) utilizes a 0.8m telescope, offering comprehensive 12-band imaging using J-PLUS crafted filters (Cenarro et al., 2019). Our study aims to generate an integrated H α + N II flux atlas for MC PNe, crucial for understanding their emission characteristics and physical properties.

Data sources include S-PLUS imaging, spectroscopy, and literature references for Magellanic Cloud PNe. We employed a methodology involving r , $J0660$ and i filters to derive integrated H α + N II fluxes. Creation of H α + N II maps utilized Python code developed by Lopes et al. (in prep.), and validation involved pseudo-slit creation and comparative spectroscopic measurements.

Figure 1 displays the combined RGB image and H α + N II flux map for PN LHA 115-N 1, utilizing S-PLUS data to explore ionized gas in planetary nebulae. The figure also compares the VLT/X-shooter spectrum (Euclid Collaboration et al., 2023) with S-PLUS photometry for the same PN, emphasizing the observed consistency between spectroscopic data and photometric observations. This highlights the S-PLUS data's efficacy in capturing essential spectral features crucial for PN characterization. The

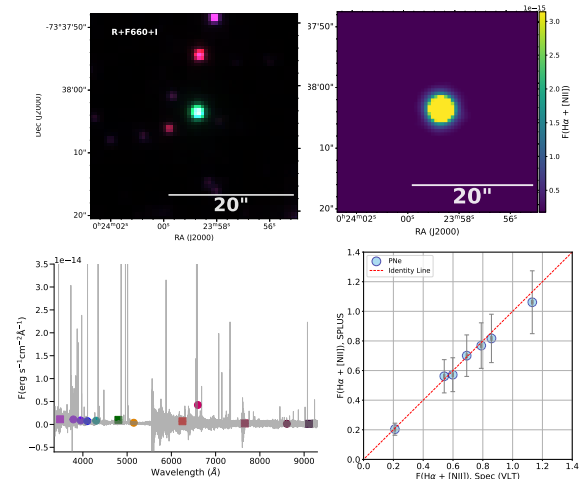


Figure 1. Upper panel: Displays an RGB image composed from r , $J0660$, and i filters (left) alongside the corresponding H α + N II flux map (right). Bottom panel: Illustrates S-PLUS photometry overlaid with VLT/X-shooter spectra of PN LHA 115-N 1 (left). Additionally, it presents a comparison between integrated H α + N II fluxes obtained from spectroscopy and photometry for seven PNe of the SMC, highlighting both their consistencies and discrepancies (right).

comparative analysis of spectroscopic and photometric H α + N II fluxes for seven PNe (right bottom) emphasizes method reliability, prompting an investigation into critical discrepancies for refining measurements. Ongoing work addresses N II effects, integrates additional spectra, and refines analysis techniques; future objectives include the broader utilization of H α flux maps for distance and temperature calculations.

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