

What do we find when nothing is found? A deep search for planetary nebulae at the outskirts of M33.

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Abstract

Planetary nebulae (PNe) are excellent tracers of stellar populations with low surface brightness, and therefore provide a powerful method to detect and explore the rich system of substructures discovered around the main spiral galaxies of the Local Group.

A search of PNe at the outskirts of the spiral galaxy M33 has been performed over a set of wide-field images in the [OIII] λ 5007Å and H α + [NII] nebular lines and continuum broadband filters (g', r'), within a completeness limit of 26 mag in the narrowband filters. The images from the INT telescope cover a 4.5 square degree area and reach a projected distance of 40 Kpc from the center of the galaxy towards M31.

An exhaustive study of the photometric data, combined with a visual search, shows the absence of bright PNe outside the limits of the disc of the galaxy on the sampled region. Inside the bright optical disc of M33, eight new PN candidates were identified, three of which were spectroscopically confirmed. Fourteen additional sources, showing [OIII] excess, were also discovered.

The results set an upper limit of $\sim 1.6 \cdot 10^7 L_{\odot}$ to the luminosity of the underlying population in the region covered by this survey, suggesting the lack of a massive classical halo. This is in agreement with the results obtained using the RGB population and it questions the claimed interaction between M31 and M33. (See poster).