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PLANETARY NEBULA CANDIDATES IN A REGION OF M 33

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Planetary nebulae (PNe) have been used to trace the chemical evolution of galaxies, not only in the Milky Way (Esteban & Peimbert 1995 and references therein) but also in nearby galaxies (Dopita et al. 1997; Richer et al. 1999; Jacoby & Ciardullo 1999). Extragalactic PNe have also been used as secondary distance indicators by means of the planetary nebulae luminosity function (PNLF, Jacoby 1997 and references therein), but for this technique complete samples of PNe up to a given magnitude are an important requirement. We present here the parallel result of a search of candidate LBV objects made in a region of M 33.

Recently Magrini et al. (2000) announced the detection of 134 candidate planetary nebulae (PNe) in M 33. This galaxy is one of the important members of the Local Group for which the PN population was poorly known. We acquired Hα, [O III] and continuum images in a search for LBV candidates in a restricted region of M 33, and found that some of the objects detected by us coincide with some of the PNe reported by Magrini et al. (2000). Our images were deeper and consequently we found more objects with the required characteristics, i.e., point-like objects bright in the continuum-subtracted Hα and/or [O III] images and without a counterpart in the continuum images. We found 48 objects with these characteristics that are presented elsewhere (Corral & Herrero 2001).

Using the relationship between S/N ratio and completeness given by Ciardullo et al. (1987) we obtain a limit of $m(5007) = 23.7$ for the sample. However, we have made no attempt to study the PNLF because it is clear that our sample is contaminated with compact H II regions. Eleven objects only show emission in Hα, and 21 more have $R = [\mathrm{O\,III}]/(\mathrm{H}\alpha + [\mathrm{N\,II}]) < 1$. Sixteen objects have $R > 1$ and are then bona fide PNe. The comparatively large contamination of the sample can be understood because we were observing a region of strong Hα emission (remember that our original purpose was to look for young objects, such as LBVs).

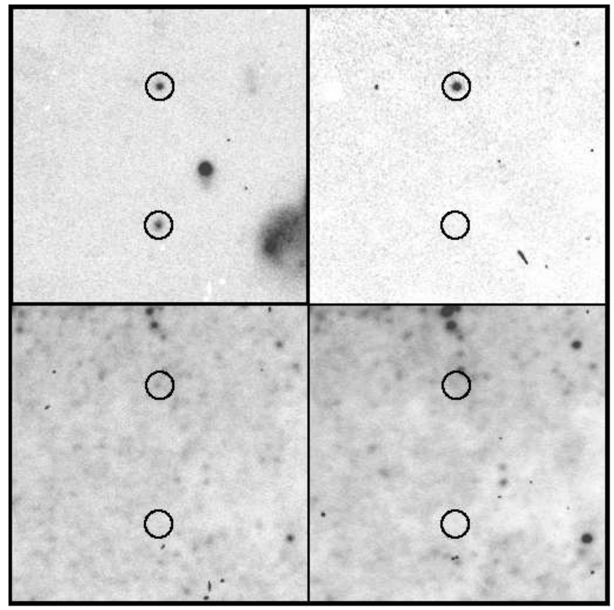

Fig. 1. Sample finding chart of two of the objects found in this work. The images are in clockwise order from the upper left image: continuum-subtracted Hα, continuum-subtracted [O III], blue and red continuum. The size of the field is $\sim 55''$ and the orientation is N up and E to the left.

We think that we will have to wait for follow-up spectroscopy and confirmation of the PN nature of the candidates before going on to work with the PNLF.

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