NEW IDENTIFICATIONS OF FAINT CENTRAL STARS IN EXTENDED PN

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ABSTRACT. As the first step toward assessing the high-mass end of the PNN (and hence, WD) mass distributions, we report here on new PNN found in extended, low surface brightness PN. Our ultimate goal is to obtain luminosities and temperatures for these stars and to compare them with evolutionary calculations to derive stellar masses. Based on studies of a local sample of PN, Schönberner (1981, 1983) and Schönberner and Weidmann (1983) infer that the PNN mass distribution is sharply peaked near 0.6 $M_\odot$, and that 80% of PNN have masses < 0.61 $M_\odot$. Their sample was necessarily chosen for the existence of photometric data for both the nebulae and their central stars, criteria that excluded small bright PN whose central stars are masked by nebular emission, and large faint PN for which there is little photometric data for the nebulae and/or the central stars. Acknowledging these selection effects, those authors have urged further investigation, especially of low luminosity PNN.

We believe that at least some PNN currently at low luminosity are high mass cores that have undergone rapid post-AGB evolution, and have faded. Precisely because of the rapid fading time associated with high mass remnants, (e.g., Iben and Renzini 1983), they are expected to be visually quite faint. We have obtained deep (m > 21) UBV images with a CCD on the KPNO 2.1-m. Of the 26 PN on our original list, we have identified central stars candidates in 17, with certainties ranging from "extremely likely" (9) to "possible" (5) (see Table 1). Characteristics strengthening a candidate's classification are: 1) central location (symmetry); 2) blue color (when known, nebular extinction was used to calculate unreddened colors, which should be blue (B-V < 0); 3) apparent magnitude at least roughly consistent with crude estimates of nebular distance.

Of course, only follow-up spectroscopy can confirm our identifications unequivocally. However, the apparent faintness of these stars (the brightest is V = 17) will require long integration times.

TABLE 1. Nebulae with Newly Identified Central Stars

A5*	A59	K2-5	Pu-1	We-5
A9*	A80*	M1-28	Pu-2	
A18	Hel-4	M4-11	S188	
A45*	K2-2	NGC 6852	We-2	

*Abell (1966) lists a "possible" candidate.

REFERENCES

Abell, G.O. 1966, *Ap. J.*, 144, 259.
Iben, I., Jr., and Renzini, A. 1983, *Ann. Rev.*, 21, 217.
Schönberner, D. 1981, *Astron. Astrophys.*, 103, 119.
Schönberner, D. 1983, *Ap. J.*, 272, 708.
Schönberner, D., and Weidemann, V. 1983, in *Planetary Nebulae, IAU Symposium No. 103*, ed. D. Flower (Dordrecht: D. Reidel), p. 359.

S. Torres-Peimbert (ed.), Planetary Nebulae, 303.