Narrow Band CCD Imaging of Four PNe

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We present first results of a project to construct and study spatio-kinematical models of selected Planetary Nebulae (PNe). Deep monochromatic CCD images of A8, A4, M2-55, and J-320 were made with the Calar Alto 2.2m telescope and the two interference filters 5005/90 and 6574/104 for the [O III] and Hα+[N II] emission lines. The images were corrected for bias and dark, and flatfielded using MIDAS software, and also corrected for atmospheric extinction to derive the total flux in each emission line. The observed parameters are summarized in Table 1. – A8 (PN G167.0–00.9) has a very symmetric, round appearance with large diameter. The Hα+[N II] image clearly shows a round, limb-brightened ring which is less apparent in the [O III] image. Due to its appearance we can classify it as a late round type according to Balick (1987).. – M2-55 (PN G116.2+08.5) has a box-like, quadratic and highly structured inner part (slightly more roundish in [O III]), with four maxima at the corners. The faint outer parts seem to consist of two ovals that are perpendicular to each other. Together, they again resemble a square tilted 45° against the inner one. The Hα+[N II] image is larger than [O III]: The square (distance of maxima) by some 20 percent, the faint ovals by about 10 percent. We can classify this PN as a middle elliptical type. – A4 (PN G144.3–15.5) is a spherical shell, with some definite structure in the brightest parts. This structure forms roughly a ring halfway between the center and the rim. A4 can be classified as an early round type. Both images are quite similar, the Hα+ [N II] maximum lying slightly, about 20 percent, farther from the center. In the very faint outer regions, the [O III]/(Hα+[N II]) ratio seems to increase by a factor of about 5 above the average which is otherwise constant within 10 percent over the whole image. – J-320 (PN G190.3–17.7) is elongated, with one maximum on the main axis, slightly off-center. The Hα+[N II] image has an interesting structure which is not present in [O III]: Two stripes of decreased intensity that are roughly parallel to and on both sides of the main axis. At present, we have no explanation for this feature. J-320 has ansae (small knots found in pairs on opposite sides and at equal distance from the nucleus) usually seen best in the light of low-ionization emission lines. Balick (1987) classified this PN as early type butterfly.

Table 1: Observed parameters of the sample

Name	exposure time (sec)		angular radius	Total Flux (10^{-11} ergs sec^{-1}cm^{-2})	
	[O III]	Hα+[N II]	(")	[O III]	Hα+[N II]
A8	2700	2700	29	0.18	0.25
M2-55	1800	1200	23x19	0.95	1.80
A4	2400	2700	12	0.44	0.16
J-320	600	180	4.6x3.2	5.80	1.59

REFERENCES

Balick, 1987, Astron. J. 94, 671

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