

## CHEMICAL ABUNDANCES IN GALACTIC BULGE PN

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**Abstract.** We present abundance determinations, in particular of carbon, and C/O ratios, for 11 Galactic bulge planetary nebulae (PN) based on our low resolution UV data from IUE observations and optical spectrophotometry from the Anglo-Australian Telescope. We compare the observed abundances with those predicted by dredge-up theory for the high metallicity Galactic bulge. The sample abundances are also contrasted with the abundances found for PN in the Galactic disk. The mean C/O ratio for the bulge PN is significantly lower than that found for Galactic disk PN. Further, we present an abundance analysis of the very metal-poor bulge PN M2-29. From an analysis of the differential extinction found from the observed ratios of the He II 1640,4686Å lines, we find that the ultraviolet reddening law towards the bulge is steeper than in the solar neighbourhood.

**Table:** Our abundances determined for the bulge PN and the values found for local neighbourhood PN, taken from Torres-Peimbert & Peimbert (1977, *Rev Mex Astron Astrofis*, 2, 181) and Aller & Czyzak (1983, *ApJS*, 51, 211), are shown.

M2-29 is excluded from the means as it is a low metallicity halo PN located in the bulge.

\* The only one of our bulge PN with C/O clearly in excess of unity (Cn 1-5) has a WC4 Wolf-Rayet central star.

### Bulge PN Elemental Abundances

Object	He	C ×104	N ×104	O ×104	Ne ×104	C/O	N/O
M 3-21	0.118	2.28	2.98	7.04	1.57	0.32	0.42
H 1-42	0.107	—	0.97	5.34	0.74	—	0.18
M 2-23	0.084	—	1.34	2.93	0.45	—	0.46
M 1-42	0.194	0.72	3.21	1.94	0.63	0.37	1.65
Cn 1-5*	0.143	13.3	3.98	7.67	2.44	1.74	0.52
M 2-30	0.112	0.99	1.08	4.65	1.05	0.21	0.23
Hb 8	0.104	0.35	0.32	3.29	0.60	0.11	0.096
Al 1	0.103	5.36	2.31	4.75	1.03	1.13	0.49
Vy 2-1	0.105	4.35	1.94	5.96	1.38	0.73	0.33
M 3-33	0.112	0.55	—	2.61	—	0.21	—
M 2-29	0.093	0.01	0.17	0.28	0.039	0.036	0.62
Local PN	0.100	5.50	0.91	4.79	0.96	1.15	0.19
Bulge mean	0.118	3.49	2.01	4.62	1.10	0.60	0.49
±	0.029	4.10	1.14	1.83	0.59	0.53	0.44