

## Chemical Composition of Galactic Planetary Nebulae and HII Regions in Blue Compact Dwarf Galaxies: New Determination

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The expressions of new ionization-correction factors (ICF) (see these Proceedings) are employed for the determination of chemical composition of the 200 galactic planetary nebulae (PN) and 43 HII regions in blue compact dwarf galaxies (BCDG). We have used PN spectra from different papers published previously ( $> 100$ ) and HII region spectra from (Izotov, Thuan, & Lipovetsky 1994, Izotov, Thuan, & Lipovetsky 1997, Thuan, Izotov, & Lipovetsky hys. J. 1995). Code DIAGN (Holovaty et al. 1999) developed at Astronomical Observatory of Lviv National University is also used. Atomic data for determination of  $n_e, T_e$  and the ionic abundances ( $A^{+i}/H^+$ ) were modified to be compatible with the CLOUDY94 code (Ferland G.J. 1999).

The method of the chemical composition determination of PN is described by (Golovaty et al. 1993). The He/H abundance in HII regions is determined using different (Brocklehurst 1972) and (Smits 1996) emissivities with (Kingdon & Ferland 1995) collisional enhancement factors. The chemical composition was determined using the expression:  $\log(A/H) = \log(A^{+i}/H^+) - f(x)$ , where  $f(x)$  are defined in Holovaty et al. in these Proceedings. The results are located at [ftp://astro.franko.lviv.ua/pub/PN/PN\\_Chemcom.ps](ftp://astro.franko.lviv.ua/pub/PN/PN_Chemcom.ps) for PN and [ftp://astro.franko.lviv.ua/pub/BCDG/DG\\_Chemcom.ps](ftp://astro.franko.lviv.ua/pub/BCDG/DG_Chemcom.ps) for HII regions.

These chemical compositions are used for the analysis of the Y-Z relationship (see Figure 1). Primordial helium abundance  $Y_p$  and heavy element enrichment  $dY/dZ$  are estimated. Thus, the parameters  $Y_p$  and  $dY/dZ$  obtained from the linear approximation are as follows :

$Y_p$	$dY/dZ$	
0.241	3.25	for Type IIb PN
0.243	3.20	for Type IIa PN
0.310	4.11	for Type I PN
0.235	4.28	for Type IIa,b PN and HII regions (B72)
0.247	3.38	for Type IIa,b PN and HII regions (Sm96)

For the parabolic approximation we derive:

$Y_p$	
0.221	for Type IIa,b PN and HII regions (B72)
0.238	for Type IIa,b PN and HII regions (Sm96)

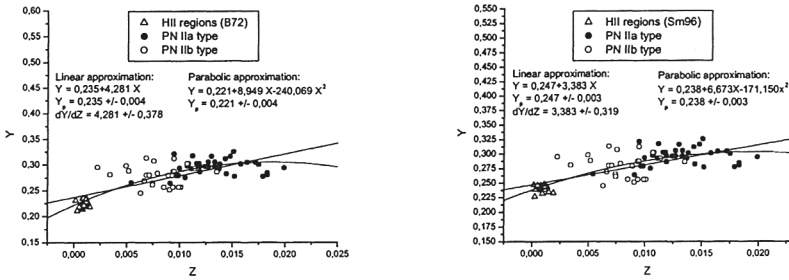


Figure 1. The relationship between helium and metal content.

For the linear approximation we obtain the correlation coefficients  $R = 0.56$  for (Smits 1996) and  $R = 0.77$  for (Brocklehurst 1972) emissivities. For the parabolic approximation the correlation coefficients are  $R = 0.67$  for (Smits 1996) and  $R = 0.73$  for (Brocklehurst 1972) emissivities. In both cases of emissivities and approximations the values of standard deviation are  $SD = 0.02$ .

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