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NEW LIGHT ON THE SEARCH FOR LOW-METALLICITY GALAXIES

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In many cases the oxygen abundance can only be estimated using empirical methods such as R_{23} (Pagel et al. 1979), S_{23} (Vílchez & Esteban 1996) or S_{234} (Oey & Shields 2000). But in face of the weak points and limitations of each R_{23} and $S_{23(4)}$ methods, we understand that a more precise calibration with another method involving easily measurable lines, for a larger redshift range and with a monotonic low-dispersion relation, would be highly desirable.

In this work we have used the best available data to explore the usefulness of the N_2 abundance calibrator, where N_2 = [N II] λ6584/Hα (Storchi-Bergmann et al. 1994). The metal-rich galaxy sample includes data from Díaz et al. (2000a,b), Terlevich et al. (1991).

We have used the N_2 estimator to select low metallicity candidates from redshift survey quality data. We have found six metal-poor galaxies ($7.6 < 12 + \log \mathrm{O/H} < 8.0$) selected from the Durham/UKST Galaxy Redshift Survey (Ratcliffe et al. 1998). We find that metal-poor galaxies represent only a small fraction (0.2%) of the total observed emission line galaxies. Our next approach is to use the N_2 estimator in a large redshift survey of galaxies such as 2dF aiming to significantly increase the present sample of metal-poor galaxies and perhaps more importantly to study the cosmological abundance evolution. In an attempt to quantify the dispersion in the N_2 relation, we have studied the connection between the scatter of the N_2 parameter with the equivalent width of Hβ. We find a slight tendency for galaxies with positive residuals to have the largest EW(Hβ). We do not report any other trend of the residuals with EW(Hα) or with log([O II]/[O III]).

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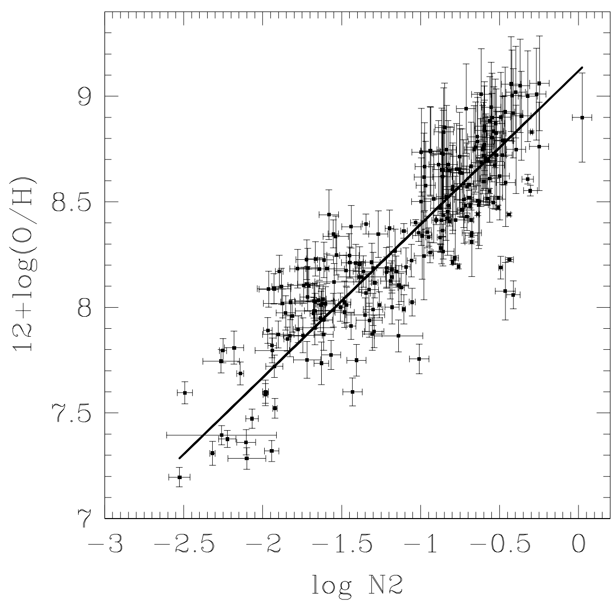

Fig. 1. The N_2 metallicity calibrator is defined as N_2 = [N II] λ6584/Hα. The linear fit to the data, taking into account the dispersion in the distribution, gives $12 + \log \mathrm{O/H} = 9.12 + 0.73 \log(N_2)$, with a correlation coefficient of 0.85.

This work is discussed more fully in Denicoló, Terlevich, & Terlevich (2002).

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