METAL ABUNDANCES OF DAMPED LYα SYSTEMS AND THE CHEMICAL EVOLUTION OF SPIRAL GALAXIES

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Our chemical evolution models describe in detail the enrichment process of a number of individual elements from ^{12}C to ^{56}Fe, including delayed SNI contributions. Variation of the characteristic timescale of star formation (SF) t_* not only results in differences in the abundance evolution but also changes abundance ratios of elements originating from different nucleosynthetic sites, as e.g. [C/O], [O/Fe], or [Mg/Fe].
Metal abundances derived from curve of growth determined column densities are available now for a large number of damped Lyα absorbers ($\leftrightarrow$(proto-)galactic disks) over a redshift range $0.7 \lesssim z \lesssim 4$.
We show that for SF timescales t_* typical of spiral galaxies the evolution of abundances **and** element ratios is in good agreement with observations of damped Lyα systems over a large portion of the Hubble time.
The scatter of metallicities and abundance ratios of damped Lyα absorbers at fixed redshift can entirely be understood in terms of a range of SF timescales t_* as empirically derived for the near-by Hubble sequence of spiral galaxies $2 \leq t_*[\mathrm{Gyr}] \leq 16$ for $Sa, \ldots, Sd$.
Comparison with the redshift evolution of narrow MgII and CIV lines from galaxy halos (Fritze – v. Alvensleben *et al.*, A&A **224**, L1, 1989, A&A **246**, L59, 1991) may serve to constrain spiral galaxy formation scenarios.
Together with the detailed chemical evolution, our models also give the spectrophotometric evolution of the different Hubble types of galaxies. Comparison with optically identified MgII and CIV absorbers shows that R - magnitudes are consistent with those of luminous ellipticals or early spirals, while in their colours they rather resemble mid – late type spirals (Steidel 1993, in *The Evolution of Galaxies and their Environment*, eds J. M. Shull & H. Thronson, p. 263). Does this point to interaction and/or metallicity effects?

Acknowledgement This work was supported in part by the Verbundforschung Astronomie through BMFT grant WE-010 R 900 40.