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Chemical abundances in the ancient Milky Way: G-type SDSS stars

Automated determination of $T_{\rm eff}$, log g, [Fe/H] and [α/Fe]

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Abstract. We have developed TGMETα in order to determine $T_{\rm eff}$, log g, [Fe/H] and [α/Fe] for large samples of FGK stars observed at various spectral resolutions. Tests on several hundred echelle spectra of reference stars degraded to low resolution (R=1.000) indicate typical rms precisions of $\sigma(T_{\rm eff})\sim150$ K, σ(logg)$\sim$0.44, σ([Fe/H])$\sim$0.15 and σ([α/Fe])$\sim$0.06. We have used TGMETα to determine atmospheric parameters and α-abundances from $\sim$15000 SDSS stellar spectra. Thanks to this very large sample we have investigated the vertical, radial and rotational properties as well as the abundance ratio of α elements to iron, [α/Fe], of samples representative of the thick disk and the halo. Results presented in the poster, provide new constraints on galactic thick disk formation models. We find evidence for a strong negative radial gradient in [α/Fe] with a lack or small one in [Fe/H] in the thick disk. Moreover, there is a lack of vertical gradient in both [Fe/H] and [α/Fe]. These features have to be reconciled with the timescale of the thick disk formation as well as with the SFR, IMF, infall of gas or accreted satellite debris.

Key words. Stars: Thick Disk – Stars: Galactic Halo – Stars: fundamental parameters, abundances – Galaxy: structure – Galaxy: stellar content

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