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Revised magnesium abundances in galactic halo and disk stars

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Abstract

A differential analysis of the magnesium abundances in 61 F-K dwarfs and subgiants with metallicities $-2.6 < [\text{Fe}/\text{H}] < +0.2$ is performed based on published observational data. Fundamental parameters for 36 stars are determined: T_{eff} from V-K and V-R; $\log g$ from HIPPARCOS parallaxes, and $[\text{Fe}/\text{H}]$ and ξ from Fe II lines. The computations allow for non-LTE effects in the formation of the Mg I lines. For most of the stars, the standard errors in the Mg abundances do not exceed 0.07 dex. The metallicity dependence of $[\text{Mg}/\text{Fe}]$ is analyzed. Magnesium shows a constant overabundance relative to Fe of 0.46 ± 0.06 dex for metallicities $-2.6 < [\text{Fe}/\text{H}] < -0.7$ Mg. The Mg overabundance decreases abruptly to $\sim +0.27$ dex at $[\text{Fe}/\text{H}] \approx -0.7$. At higher metallicities, the Mg abundance smoothly decreases to the solar value at $[\text{Fe}/\text{H}] = 0.0$. Halo stars with metallicities $[\text{Fe}/\text{H}] < -1.0$ exhibit lower Mg overabundances ($[\text{Mg}/\text{Fe}] = +0.22$ dex) compared to the $[\text{Mg}/\text{Fe}]$ values for other stars with similar $[\text{Fe}/\text{H}]$. © 2001 MAIK "Nauka/Interperiodica".

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