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Element-abundance inhomogeneity of interstellar matter as it follows from the chemical composition of the O-type supergiants HDE 226868 (Cyg X-1) and α Cam

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Abstract

By means of synthetic spectrum modeling with non-LTE effects, we determined element abundances in the atmospheres of two O supergiants with similar physical characteristics: HDE 226868 (the optical component of Cyg X-1) and α Cam. These objects are situated at the distance about 2.5 kpc from each other. HDE 226868 has higher abundances compared to α Cam. The differences of Al, S, Zn, and averaged CNO abundances are within 0.15-0.30 dex. This is in a good qualitative agreement with the inhomogeneity of the heavy-element distribution over the Galactic disk derived by Luck et al. (2006) from Cepheids. This finding confirms the inhomogeneity of chemical-element distribution on the scale of 2 kpc and is in agreement with the concept of interstellar-matter superclouds preserving their intrinsic particularities on a time scale in excess of 1 Gyr. © 2013 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

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Keywords

ISM: abundances, ISM: clouds, Stars: abundances, Stars: individual (HDE 226868, α Cam), Supergiants