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Lithium abundances in the old open cluster NGC 3960 from VLT/FLAMES observati

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Abstract

Context. Old open clusters are very useful targets to investigate mechanisms responsible for lithium (Li) depletion due to stellar evolution. Comparison of the Li abundances in clusters of different age allows us to understand the efficiency of the Li destruction process.

Aims. To determine the membership and Li abundance in a sample of candidate members of the open cluster NGC 3960 (NGC 3960) in the gap between 0.6 and 2 Gyr in the empirical description of the behavior of the average Li abundance as a function of the cluster age.

Methods. We use VLT/FLAMES Giraffe spectra to determine the radial velocities and thus the membership of a sample of selected candidate cluster members. From the analysis of the Li line we derive Li abundances for both cluster members and field stars.

Results. 39 stars have radial velocities consistent with membership, with an expected fraction of contaminating field stars of about 30%. In 29 of the radial velocity members; we consider these stars as cluster members, while we make the reasonable assumption that the remaining 10 radial velocity members without Li are among the contaminating stars. Li abundances of the stars hotter than about 6000 K are similar to stars in the Hyades, while they are slightly smaller for cooler stars. This confirms that NGC 3960 is older than the Hyades.

Conclusions. The average Li abundance of stars cooler than about 6000 K indicates that the Li Pop. I plateau might start at about 0.6 Gyr, which is the upper limit previously derived in the literature. We also find that the fraction of field stars with high Li abundance is about a third of the whole sample, which is in agreement with previous estimates. The fraction of contaminating field stars is consistently derived by us from photometry.

Key words: stars: abundances / stars: evolution / Galaxy: open clusters and associations: individual: NGC 3960

* Based on observations collected at ESO-VLT, Paranal Observatory, Chile, Programme numbers 73.D-0520(A)

** Table 4 is only available in electronic form at <http://www.aanda.org>

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