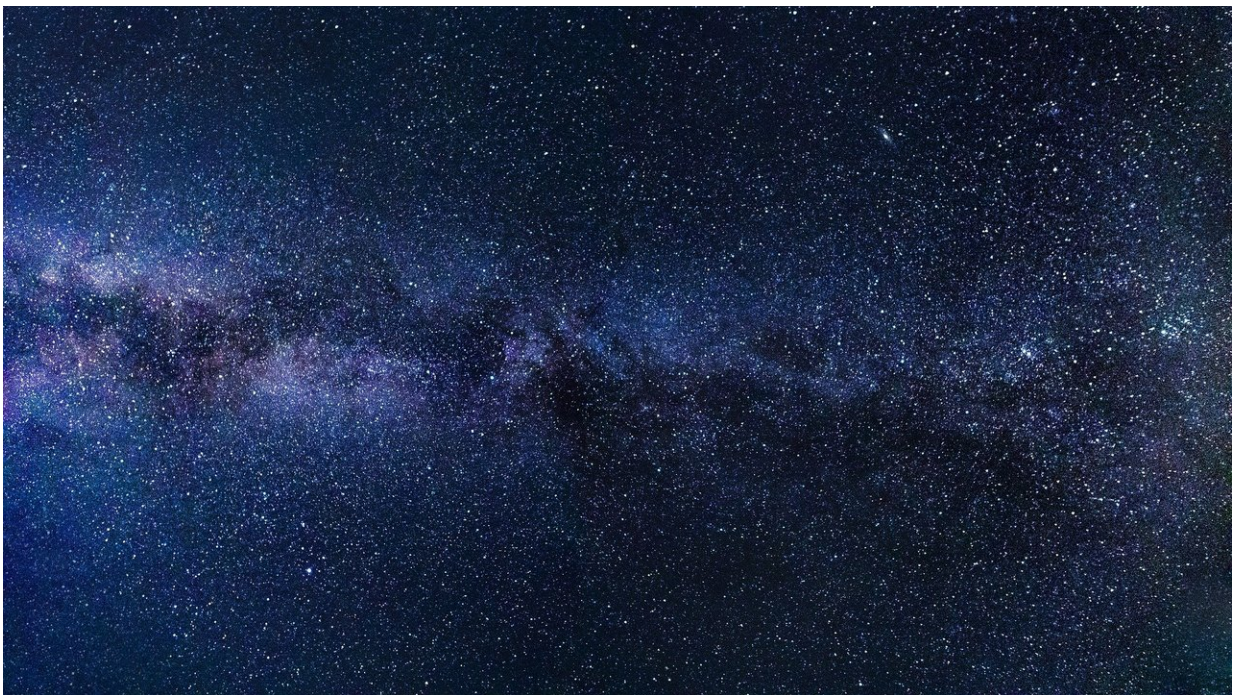


Relationship between Li abundance and chromospheric activity indicator for active stars

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In a study published in *Astronomy & Astrophysics*, Prof. Xing Lifeng from Yunnan Observatories of the Chinese Academy of Sciences and his collaborators found the chromospheric activity index of a sample active stars increases with increasing lithium abundance.

Chromospherically active (CA) [stars](#) are a class of active stars characterized by strong chromosphere, transition region and coronal activity. Some of the objects are spectroscopically remarkable, showing evidence of very rapid rotation and that the Li I doublet at 670.8 nm. Whether a tight relation exists between the chromospheric activity and the lithium abundance in the chromospheric active late-type stars is still an open question. This relation can serve as a basis for the understanding of the relationship among activity, the light elements content and rotation of stars.

To investigate the correlation between the lithium abundance and the chromospheric activity for the chromospherically active late-type stars, the researchers selected a sample includes 14 active stars. These stars were selected from the cross-correlation of the ROSAT X-ray catalog and the Tycho catalog, and they are strong X-ray sources that have been identified as late-type stars. Spectroscopic observations for these sample stars were performed with the Coudé Echelle Spectrograph attached to the 1.8 m telescope at the Lijiang observatory of Yunnan Observatories.

Based on the high-resolution [spectroscopic observations](#) for the sample active stars, the researchers calculated the lithium abundance (on a scale where $\text{Log } N(\text{H}) = 12.00$) using the comparison of the measured Li I λ 670.8 nm equivalent width with curve of growth calculations in non-localthermodynamic-equilibrium conditions. The results showed that relationship between lithium abundance and the Ca II H & K emission index is that the activity of sample stars increases with increasing lithium abundance.

Moreover, the researchers found that the lithium abundance analogs progressively decrease as the rotation periods increase (rotation becomes slow) and the large values of the log R'HK go along with small values of Rossby numbers for the sample of chromospherically active stars.

The [study](#) indicates that the [lithium](#) abundance of 14 chromospherically active stars' analogs progressively increases as the chromospheric activity index increases and/or the rotation periods decrease.

More information: Li-Feng Xing et al, Lithium abundance in a sample of active stars: High-resolution spectrograph observation with the 1.8 m telescope, *Astronomy & Astrophysics* (2021). [DOI: 10.1051/0004-6361/202039203](#)

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