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The Sun as a star: New insights from full-disk observations with ALMA

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ALMA provides a new set of eyes to look at the stars including our Sun. In particular, the brightness temperatures provided by ALMA give insights about the thermal structure and activity of stellar atmospheres. The Sun, being the closest star, can be observed well resolved and thus be used as a reference case for solar-like stars. The overall aim of the presented study is to construct more robust solar/stellar activity indicators using ALMA observations in comparison with classical diagnostics.

Here, full disk solar maps from ALMA are compared with SDO-AIA and HMI maps and, with full disk H-alpha and Ca II maps to understand the correlation between them, which also provides constraints for the height range from where these mm emissions originate. The centre to limb variation in temperature observed for ALMA maps shows limb brightening which confirms the expectation that the radiation observed with ALMA originates from the chromosphere. In order to transfer the insights gained from solar ALMA observations to other stars, the full disk solar maps are converted into a corresponding stellar signal. Here we present the first results.

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