



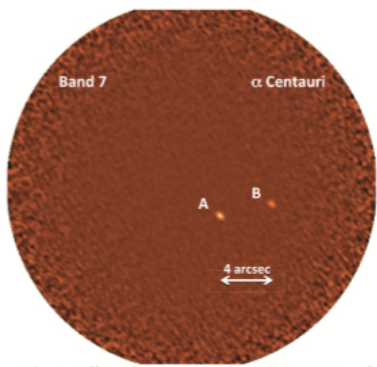
# The Sun as a star

## New insights from full-disk observations with ALMA



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2015A&A...573L...4L

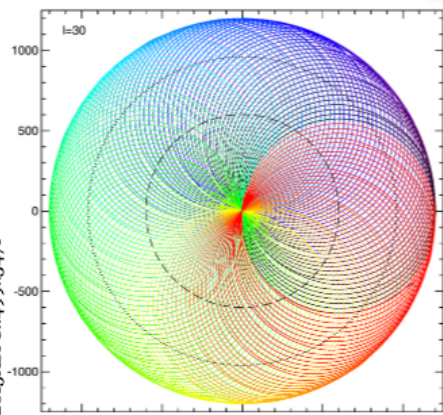


First stellar observation from ALMA Band 7

### Aims:

- Comparing the ALMA TP maps with other diagnost
- Centre-to-Limb-Variation (CLV)
- Verification of correction factors for ALMA TP map:

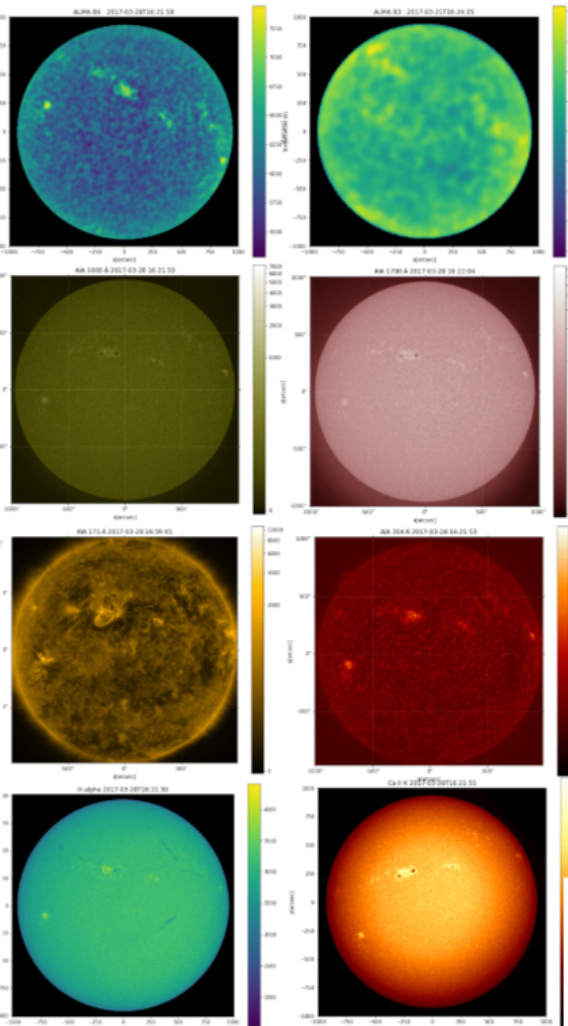
2015ASPC...499...347P



### Double circular pattern:

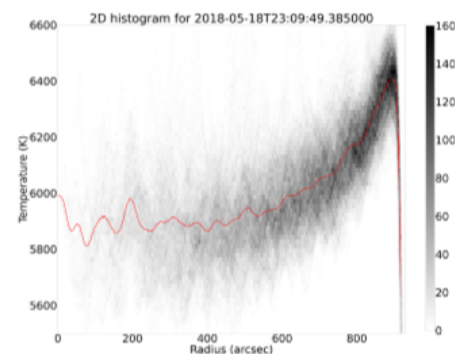
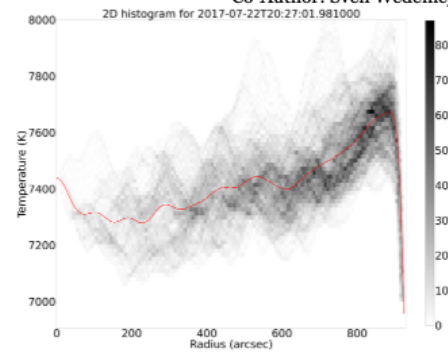
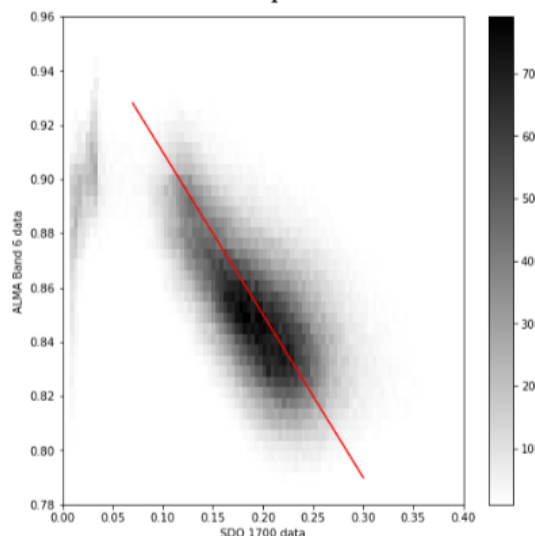
a circular spiral of the diameter half the full disk (bigger than the solar full disk) in a circle of the diameter of the full disk.

- It takes around five (three) minutes to take Band 6 (3) full disk map observation.

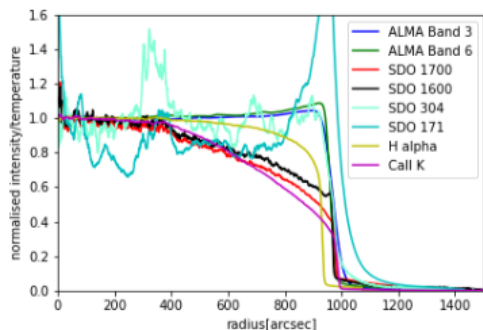
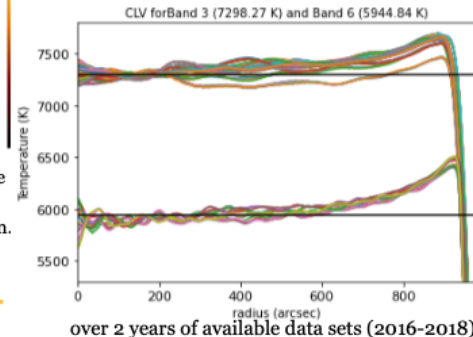


On the upper hemisphere, there are two bright regions. Near the limb there are bright spots as well. The SDO maps have higher resolution. Different channels show us different layers of the sun. These falsecolour images have arbitrary scales, unlike in ALMA, where these are brightness temperatures.

- 2D histogram of the SDO 1700 channel and ALMA band 6 data.
- Density of the data is seen to be in the top left corner and it is taken in the focus.
- The red fitted line has a slope of  $-0.6$ .

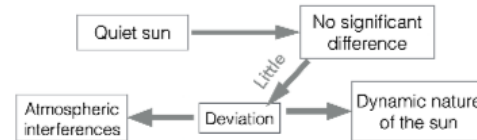


The average temperature for the band 3 observations 7220 K, for the band 6, it is 5945K K. Band 3 has more fluctuations in temperatures as compared to band 6, because of the lower resolution.



The CLV plot below shows comparison of different diagnostics represented in Fig.1.

- The Ca II K map and H map show continuous limb darkening similar to SDO channels 1700Å & 1600Å.
- SDO channel 171Å shows a peak near the limb which can be attributed to the features like spicules seen densely at the limb.
- In 1700Å channel there are dark spots.
- Bright limb spots are also seen in 304 Å channel.



- The deviation is more in the case of band 3.
- Sub-clusters seen for each day.
- Limb brightening more in the case band 3.

### Goals for future:

- Integrating the solar signal and getting estimates for solar activity indicators
- Comparative study of the solar and stellar activities
- Model atmospheres for main sequence stars
- Comparative study of various activity estimates and physical properties with reference to the sun

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