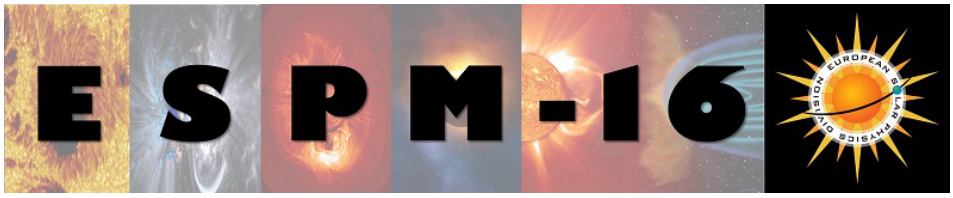

Contribution ID: **381** Type: **Talk**

Where is the base of the Transition Region? SDO, TRACE and ALMA observations

Monday 6 September 2021 14:40 (15 minutes)

Atmospheric models place the Chromosphere-Corona Transition Region at $\sim$ 2Mm above the $\tau_{5000} = 1$ level. Os course, the upper part of the chromosphere is highly inhomogeneous, with spicules intruding into the corona. There is, however, a more homogeneous lower region, as evidenced in the MgII triplet lines, extending to $\sim$ 2Mm (Alissandrakis etal.; https://doi.org/10.1007/s11207-018-1242-4). In SDO and TRACE images spicules appear in emission in the 1600, 1700 and 304A bands and in absorption in the EUV bands; the latter is due to photo-ionization of HI and HeI, which increases with wavelength. At the shortest available AIA wavelength and taking into account that the photospheric limb is ~ 0.34Mm above the $\tau_{5000} = 1$ level, we found that TR emission starts at ~ 3.7Mm; extrapolating to $\lambda = 0$, where there is no chromospheric absorption, we deduced a height of 3.0 ± 0.5Mm, above the value of 2.14Mm of Avrett and Loeser (2008,ApJS,175,229).
Another indicator of the extent of the chromosphere is the height of the network. This produces a limbward shift of features with respect to the position of their counterparts in magnetograms. Using this approach, we measured heights of 0.14 ± 0.03Mm(1700A), 0.39 ± 0.06Mm(1600A) and 3.29 ± 0.23Mm(304A), with a possible solar cycle variation.
A third indicator is the position of the limb in UV as well as in ALMA mm-λ images. This is not very reliable, as the limb position is affected by spicules, but it is indicative. We obtained values of 1.4 ± 0.2Mm(1600A), 2.4 ± 0.7Mm(ALMA 1.26mm), 4.2 ± 2.5Mm(ALMA 3mm) and 5.7 ± 0.2Mm(304A).
Putting everything together, we conclude that the average chromosphere extends higher than homogeneous models predict.

Student poster?

Author: Prof. ALISSANDRAKIS, Costas (University of Ioannina, Greece)

Presenter: Prof. ALISSANDRAKIS, Costas (University of Ioannina, Greece)

Session Classification: Plenary 2

Track Classification: Session 2 - The Solar Atmosphere: Heating, Dynamics and Coupling