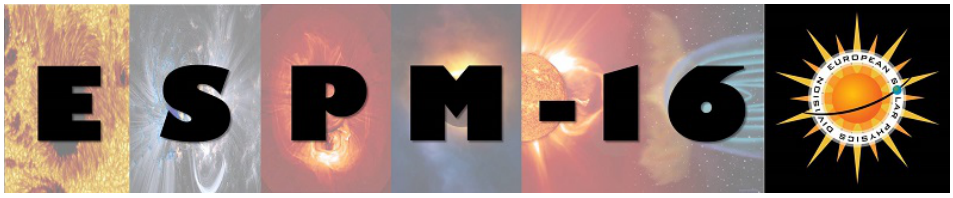

Contribution ID: **290** Type: **Poster**

ANALYSIS OF CANCELLATION INDEX IN PHOTOSPHERIC MAGNETIC FIELDS ASSOCIATED TO CORONAL HOLES

Wednesday, 8 September 2021 16:56 (13 minutes)

From more than 60 years of observations, we have known that the inner solar corona has low-density plasma structures called coronal holes (CHs). Since CHs appear to be connected to the sources of high-speed solar wind streams, which in turn are typically linked to geomagnetic storms, their study is of particular relevance in the field of Space Weather.
The connection between the photospheric magnetic field and the CHs has been studied for the same time. Compared to other regions of the corona, photospheric magnetic fields associated to CHs have a dominant magnetic polarity which results in magnetic field lines that do not close in the proximity of the Sun.
To investigate the statistical properties of the photospheric magnetic field underlying CHs and "normal"coronal regions a classical technique, the signed measure, is used. This technique allows to characterize the scaling behavior and the topology of sign-oscillating magnetic structures in selected regions of SDO/HMI LoS magnetograms.
To this end we have compared the properties of the photospheric magnetic field underlying 60 CHs and 60 non-coronal holes (non-CHs). In particular, in addition to having studied distributions and momenta of photopsheric magnetic fields associated to the selected regions, we have performed the sign singularity analysis computing the cancellation functions of the highly fluctuating photospheric magnetic fields.
Here we present the results of the analysis on the 120 sub-regions extracted from the SDO/HMI magnetograms highlighting the recurrences in the emergence scales of the sign imbalance in CHs compared to non-CHs.

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Session Classification: Poster Session 8.2

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