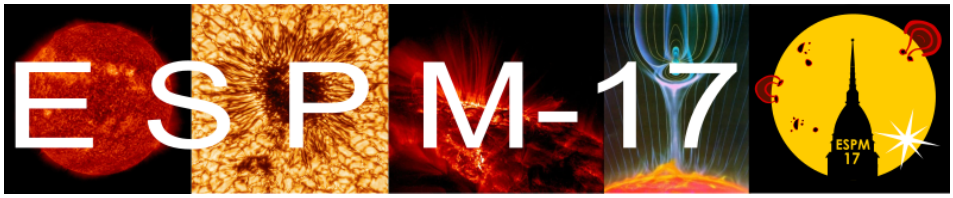

Contribution ID: **11** Type: **Poster**

Unexpected Frequency of Horizontal Oscillations of Magnetic Structures in the Solar Photosphere

It is well known that the dominant frequency of oscillations in the solar photosphere is at ≈3 mHz, which is the result of global resonant modes pertaining to the whole stellar structure. However, analyses of the horizontal motions of nearly 1 million photospheric magnetic elements spanning the entirety of solar cycle 24 has revealed an unexpected dominant frequency ≈5 mHz, i.e., a frequency typically synonymous with the chromosphere. Given the distinctly different physical properties of the magnetic elements examined in our statistical sample, when compared to largely quiescent solar plasma where ≈3 mHz frequencies are omnipresent, we argue that the dominant ≈5 mHz frequency is not caused by the buffeting of magnetic elements, but instead is due to the nature of the underlying oscillatory driver itself. This novel result was obtained by exploiting the unmatched spatial and temporal coverage of magnetograms acquired by the Helioseismic and Magnetic Imager (HMI), onboard NASA's Solar Dynamics Observatory (SDO). Our findings provide a timely avenue for future exploration to better understand the magnetic connectivity between sub-photospheric, photospheric, and chromospheric layers of the Sun's dynamic atmosphere.

Primary author: BERRETTI, Michele (Università degli Studi di Trento, Università degli Studi di Roma "Tor Vergata")

Co-authors: STANGALINI, Marco (ASI Agenzia Spaziale Italiana); VERTH, Gary (Plasma Dynamics Group, School of Mathematics and Statistics, The University of Sheffield, Hicks Building); JAFARZADEH, Shahin (Max Planck Institute for Solar System Research / Niels Bohr International Academy); JESS, David B. (Astrophysics Research Centre, School of Mathematics and Physics, Queen's University Belfast/ Department of Physics and Astronomy, California State University Northridge); BERRILLI, Francesco (Università degli Studi di Roma "Tor Vergata"); GRANT, Samuel D. T. (Astrophysics Research Centre, School of Mathematics and Physics, Queen's University Belfast); DUCKENFIELD, Timothy (Astrophysics Research Centre, School of Mathematics and Physics, Queen's University Belfast); FEDUN, Viktor (Plasma Dynamics Group, Department of Automatic Control and Systems Engineering, The University of Sheffield)

Session Classification: Coffee break and poster session 1

Track Classification: Fundamental mechanisms of solar plasmas: magnetic reconnection, waves, radiation and particle acceleration