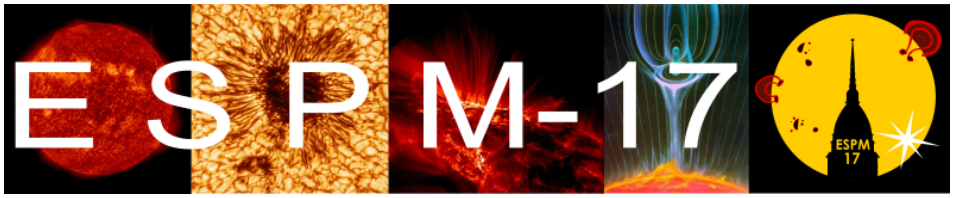

Contribution ID: **31** Type: **Poster**

Unveiling the Dynamic Nature of Solar Bright Points: Damping Characteristics and Energy Dissipation Processes Revealed by Spectral Analysis and Deep Learning Aproach

This study investigates the damping characteristics of Doppler velocity oscillations in solar bright points (BPs) using spectral analysis and deep learning techniques.

This study analyzed Doppler shifts in the solar spectrum captured by the Interface Region Imaging Spectrograph (IRIS), focusing on periodic oscillations within BPs. The damping of red and blue Doppler shifts and employed deep learning to explore the statistical properties of damping in different solar regions.

The results revealed significant variations in damping rates across different regions. The highest damping was observed in coronal hole network BPs, indicating rapid energy dissipation. Internetwork regions showed shorter decay times and half-lives compared to network regions, suggesting higher damping rates. Coronal hole areas also exhibited shorter decay times and half-lives than active regions, likely due to lower density and weaker magnetic fields.

The findings suggest that the underdamped nature of BP oscillations provides sufficient energy to drive the fast solar wind and contribute to quiet corona heating. The rapid damping in internetwork regions and coronal holes is attributed to the influence of small-scale magnetic fields and lower plasma densities in these areas. The potential connection between network BPs and spicule activity is also highlighted, although further research is needed to fully understand this relationship.

This study provides valuable insights into the dynamic nature of solar BPs and their role in the energy balance of the Sun's outer atmosphere. The findings contribute to the ongoing efforts to decipher the complexities of the Sun's behavior and its impact on space weather phenomena.

Primary author: TAVABI, Ehsan

Co-author: Ms SADEGHI, Rayhane

Session Classification: Coffee break and poster session 1

Track Classification: Energy and mass transfer throughout the solar atmosphere and structures within