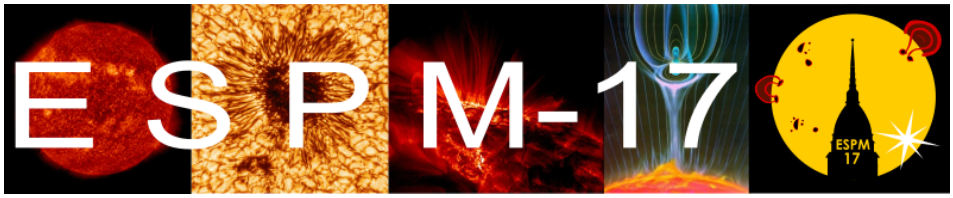

Contribution ID: **268** Type: **Poster**

The coherent morphology and evolution of solar coronal loops

Coronal loops, the arching structures filled with magnetically confined million Kelvin hot plasma, are the prominent features of the solar atmosphere. These loops are best observed in the extreme ultraviolet (EUV) and X-ray wavelengths. Coronal loop emission generally traces the magnetic field lines in the upper solar atmosphere. Thus probing their spatial morphology and evolution will help us better understand the dynamics of the magnetic field and the nature of plasma heating processes operating in the corona. The spatial morphology of coronal loops is still not fully understood. Some studies have indicated that coronal loops might be apparent optical illusions, similar to veils, caused by folds in the two-dimensional current sheets. Stereoscopic observations of coronal loops will be crucial to decipher their morphology. To this end, we used high-resolution imaging data from the Extreme Ultraviolet Imager (EUI) on the Solar Orbiter spacecraft and the Atmospheric Imaging Assembly on the Solar Dynamics Observatory to stereoscopically analyze a set of coronal loops in an active region. Our findings show that the loops have nearly circular cross-sectional widths and consistent intensity variations along their lengths over timescales of 30 minutes. We suggest that the morphology of coronal loops is consistent with three-dimensional flux tube-like structures and not emissions from randomly aligned two-dimensional current sheets along the line of sight as proposed in the 'coronal veil' hypothesis.

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Session Classification: Coffee break and poster session 1

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