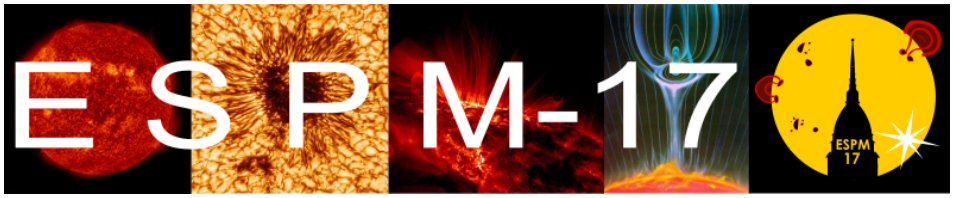

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Magnetic structure of coronal dark halos

At low coronal temperatures of approximately 1 MK, distinct regions show emission at a level significantly below the quiet Sun. Prominent examples are coronal voids in the quiet Sun and dark halos (also referred to as canopies or moats) surrounding active regions. Several models have been proposed, yet the mechanism behind the formation of dark halos remains not fully understood.
Solar Orbiter data from both the PHI and EUI instruments allow us to identify EUV-dark areas and to study the connection to the photospheric magnetic field of the dark halos in the immediate vicinity of an active region. They further allow for a direct comparison between dark halos and coronal voids.
The dark halos show slightly reduced mean unsigned magnetic fields compared to the quiet Sun. However, the difference between the magnetic field density near the inner and outer boundary of the halos is much more significant. At their outer boundary the unsigned magnetic field has decreased by 25% and is even roughly 10% - 20% weaker than outside the halos.
Co-temporal SDO/AIA observations enable us to study the emission at different coronal temperatures. While the emission is reduced and relatively homogeneous throughout the dark halos in the cool 171- angstrom channel, the dark halos show a strong gradient away from the active region in hotter channels. Hence, our EUV and magnetic field observations suggest that the halos might be due to changes in the large-scale magnetic field structure of the active region.

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