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Temporal evolution of a coronal bright point in the transition region and corona

Coronal bright points are systems of loops that connect small bipoles in the magnetic network of the quiet Sun.

While a bright point as a whole might persist for several hours, individual loops within it evolve on timescales of minutes.

Capturing their atmospheric signatures, that span from the ultraviolet to X-rays, requires simultaneous observations over a broad range of plasma temperatures from the low transition region to the corona.

We present a unique observation of a coronal bright point evolution, with Solar Orbiter at 0.29 AU from the Sun.

During more than 2 hours, the EUI imager captured the bright point near 1 MK with great detail, at a spatial resolution of about 200 km and cadence down to 3 s.

For 45 minutes, the bright point was also covered with the spectrograph SPICE through consecutive narrow, six-step raster-maps with 72 s cadence, capturing simultaneously plasma from just below 0.1 MK to 1 MK.

The surface magnetic footpoints were (partially) covered with magnetograms from PHI, showing flux emergence, and ceaseless interaction between the main polarities of the bright point and the surrounding smaller magnetic features.

The EUI images reveal complex loops, that first appear twisted and overlapping, and relax to a more parallel state.

Our preliminary analysis of a loop bundle, that appear as one elongated feature in SPICE data, shows evidence for a time delay in thermal response of about 60 s from the lower transition region plasma (below 0.1 MK) to the upper transition region (above 0.1 MK).

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