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A light bridge crossing the atmosphere

Light bridges, as seen in photospheric layers, are irregular, bright, and elongated structures that cross the umbra during the formation and decay of sunspots or pores. They play an important role in our understanding of the evolutionary stages of sunspots as they can indicate the break-up of sunspots in the decay or the formation phases of complex active regions. These structures have been extensively studied in the photosphere with full spectropolarimetric data. From these works we have good knowledge of light bridges topology and thermodynamic properties at lower atmospheric layers but its physics higher up in the solar atmosphere as well as the impact of these highly dynamic structures in the energetics above their hosting sunspots is scarce.

Currently, we are in a very good moment to make a deep study of light bridges. On the one hand, the development of (relatively-)new instrumentation as IRIS satellite or CRISP and CHROMIS instruments, both installed at the SST. On the other hand, the development of inversion codes as the STiC upgrade that includes the multi-instruments/multi-resolution effects allow us the most accurate inference when observing with several instruments at the same time.

In this talk, we present the characterization of a light bridge observed with the SST and IRIS instrumentation covering the photosphere, chromosphere, and transition region with full-spectropolarimetry and spectroscopy. This allows us to study the thermal and magnetic connectivity of this structure throughout these layers as well as its impact in the energetics of the sunspot higher layers.

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