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# Understanding the thermal and magnetic properties of an X-class flare in the low solar atmosphere

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Recent exploitation of spectropolarimetric data has significantly enhanced our understanding of the dynamical and magnetic responses of the photospheric and chromospheric layers during the rapid energy release that occurs in solar flares. In this context, we utilized high-resolution observations from 22nd October 2014, captured during an X1.6 confined flare by the Interferometric Bidimensional Spectropolarimeter (IBIS) instrument, which observes the full Stokes parameters for the Fe I 6173 Å and Ca II 8542 Å transitions.

We employed the newly developed Departure Coefficient Aided Stokes Inversion based on Response Functions (DeSIRe) code to infer the spatial distribution and vertical stratification of the atmospheric parameters in the photospheric and chromospheric layers. Our findings indicate significant temperature increases and pronounced upflows within the chromospheric flare ribbon, suggesting that the flaring event is generating hot material moving upwards. Conversely, the photosphere shows no discernible temperature rise or strong velocities, implying that the flaring event's impact is predominantly in the middle and upper layers.

The magnetic field vector information reveals relatively smooth stratifications with height for both magnetic field strength and inclination. Additionally, we observe that the spatial locations within the flare ribbon exhibit a significant depression in the height of formation (or sensitivity) for the chromospheric line, while no clear indication of this effect is found for the Fe I transition. These results confirm that, in the low atmospheric layers, the primary impact of flaring activity occurs at chromospheric levels.

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