

Sunrise III early science - Exotic emission lines absent on the solar disk and remarkable chromospheric flows observed far beyond the limb

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This work analyzes spectropolarimetric limb observations taken by Sunrise III/SUSI around 409 nm. We uncovered some exotic lines that are absent in on-disk observations but visible in off-limb observations. We first identify all the lines that appear inside the limb and those that arise outside the limb. We found intriguing chromospheric emission lines, such as H-delta and Sr II, to be as far as 10 arcsecs away from the limb. We obtained the LOS velocity map off-limb lines. The velocities were determined directly and empirically from line shifts and line shapes. Emission maps show that these exotic lines cover the region of the opacity and emissivity gap.