

Emission height of a dark region in the radiance map of the Fe XII 19.5 nm line as observed in a quiet-Sun region

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We studied the emission height of the source region of the Fe XII 19.5 nm line radiation, where it appears as a dark pattern on the radiance map. We derived the coronal magnetic field from a force-free extrapolation of the photospheric magnetogram related to that region. If the field reaches the top of the extrapolation box we consider the field lines to be open. We then used the vertical magnetic field strength (normalized to its average over the entire area considered) at any given height as a weight function in order to define, by its multiplication with the measured radiance, a new weighted radiance for each of the original pixels in the map. The weighted radiance is then summed up over all pixels in the dark region. The resulting weighted radiance still is a function of the height, and by varying this reference height, we can obtain its minimum value. The corresponding height is suggested to indicate the height of the source of the dark region. We apply this technique to a quiet-sun region where the original SOHO/SUMER observation was made on 22 September 1996. The minimum height of the weighted radiance is 20 Mm.