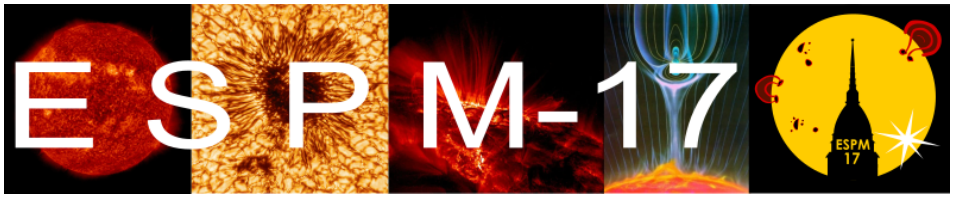

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Ca II 8542 spectra of an enhanced network region simulated with the MURaM chromospheric extension

The Ca II 8542 line forms in the lower to middle solar chromosphere. Its sensitivity to magnetic fields as well as the accessibility to ground-based telescopes make it a preferred line for chromospheric diagnostics. The spatially averaged spectra of this line show a red-asymmetry in the line core which is often indicated by a line bisector that has an “inverse C-shape”. Leenaarts et al. (2014) showed that, in order to reproduce the asymmetry in forward modeled spectra based on 3D rMHD simulations, the isotopes of calcium must be taken into account in the radiative transfer (RT) computation (isotopic splitting). In this work we use a model of the solar chromosphere simulated with the chromospheric extension of MURaM (MURaM-ChE) to study the formation of the line in the new model. Additionally, we compare the full isotope RT computation with a RT computation where an approximate composite model atom model is used. We find that after including isotopes, the spatially averaged spectral line closely matches the observed FTS ATLAS line profile. The close match to the Ca II 8542 line in the new simulations, complements modeling of other chromospheric lines such as Mg II h&k. Our findings confirm the results from Leenaarts et al. (2014) that isotopes play an important role in the formation of Ca II 8542 in the solar atmosphere.

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