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Modeling Mg II h&k in an enhanced network region simulated with MURaM

Current models of the solar atmosphere involve a comprehensive set of physics including the treatment of magnetic fields, heat conduction and radiative transfer (RT). Forward models that simulate the different layers of the solar atmosphere self consistently open the door to study the most complicated layers of the atmosphere that are subject to non local thermal equilibrium (NLTE) and non equilibrium (NE) processes such as the chromosphere. The resulting spectra of such models, that are obtained using RT codes, show significant discrepancies from the observations. In particular, chromospheric spectral lines such Mg II h&k have typically too narrow line widths and different peak asymmetry ratios in the models compared to observations of quiet sun regions. In this work, we use the recently developed radiative MHD code MURaM to simulate an enhanced network (EN) region. We discuss the resulting spectra that are obtained using 1D and 3D radiative transfer computations.

From the 1D computations, we find that compared to previous models, the line widths as well as the peak separations of Mg II h&k in our MURaM simulations are on average larger. We discuss comparisons of spatial averages as well as in bins of regions that have similar magnetic flux. In addition we discuss 3D effects calculated using the RT code Multi3D.

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