

M19a Numerical study of shock heating of the magnetic chromosphere by realistic simulation

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The problem of how to heat the solar chromosphere is still under debate, especially in the low-beta magnetic chromosphere. MHD waves are candidates for energy transportation and heating. In our study, we perform realistic radiative MHD simulation by RAMENS code with modification on non-LTE approximated radiation treatment (Carlsson & Leenaarts 2012). We catch each shock front and analyze its mode and its contribution to heating. Our result shows that fast waves could also play an important role in heating the magnetic chromosphere along with slow mode waves, which has not been pointed out by previous studies. These low-beta fast waves are considered to be generated by mode conversion from fast acoustic waves in the high-beta region. We also estimate the potential heating rate by ambipolar diffusion and find that, on average, the ambipolar diffusion heating is much smaller if compared with shock heating.