



An optimization principle to reconstructing magneto-hydro-static equilibria in the lower solar atmosphere

Xiaoshuai Zhu and Thomas Wiegelmann

Max Planck Institute for Solar System Research, Goettingen, Germany (zhu@mps.mpg.de)

Modelling the interface region between solar photosphere and corona is challenging, because the relative importance of magnetic and plasma forces changes by several orders of magnitude. While the solar corona can be modelled by the force-free assumption, we need to take care about plasma-forces (pressure and gravity) in photosphere and chromosphere, here within the magneto-hydro-static (MHS) model. We solve the MHS-equations with the help of an optimization principle and use photospheric measurements as boundary condition. Positive pressure and density are ensured by reformulating the MHS-equations by introducing two new basic variables which are derived by a transformation from pressure and density. Our code is tested by application to linear MHS solution. Although the code works in ideal conditions, there are obstacles still to be overcome before the code can be applied to real data.