Physical modelling of the relationship between local and global structures of solar magnetic fields

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Extended regions of the solar corona are dominated by the magnetic pressure (plasma-$\beta < 1$). Hence, the magnetic field it is of decisive importance for understanding the coronal dynamics. Unfortunately, the solar magnetic field can be systematically more or less directly only in the photosphere. Hence for years force-free magnetic fields were assumed to develop more and more sophisticated mathematical extrapolation methods to obtain an impression about the structure of the coronal magnetic field. In fact, the general, global structure of the coronal magnetic field is, indeeed, well illustrated by such approach. However, it fails at places, where plasma processes lead, e.g., to the formation of perpendicular currrents, to reconnection or other dissipative processes, important to understand the solar coronal dynamics. Indeed, in the course of the dynamical evolution of the coronal plasma local processes can restructure the magnetic field leading to global consequences. Combining a large scale fluid approach with the results of plasma kinetic investigations of the local physics we investigate the influence of local plasma processes on the large scale restructuring of the solar magnetic field and vice versa - the influence of the global structures on the local physical processes. We show that a combination of the two aspects is necessary to understand phenomena like the acceleration of the fast solar wind in coronal holes.