Analytic relations between the upstream and downstream distribution functions of an ion plasma crossing an MHD shock

M. Siewert and H.-J. Fahr

Argelander-Institut für Astronomie, Universität Bonn (msiewert@astro.uni-bonn.de)

MHD shocks dominate the vast majority of models aiming to describe physical processes in astrophysical plasmas. Usually, these shocks are described using a set of MHD jump conditions as functions of a few low-order velocity moments of the distribution function. However, in the presence of a magnetic field, these jump conditions are underdetermined, with the downstream pressure anisotropy usually taking the part of the missing parameter. Amining to arrive at a more precise description of the MHD shock, we have recently developed a Boltzmann-kinetic model of the shock transition region. Fully analytic relations between the upstream and the downstream plasma distribution functions are presented, as well as physical implications following from these results.