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Passage of the multi-species solar wind plasma over the termination shock determining the heliosheath plasma conditions

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As an example for the solar wind termination shock the physics of a multi-ion plasma passing over an MHD shock is studied. As we can show the different upstream plasma species, different in energy, electric charge and mass, undergo different specific reactions when being convected from upstream to downstream of the shock structure. Conserving typical plasma invariants and being forced by frozen-in fields to comove with a joint bulk velocity it is shown that the downstream ion temperatures are species -typically different, being highest for electrons. As will be shown then, the compression ratio, actually occuring at the shock, turns out as a multi-species property that must be found from an implicit algebraic equation describing the multispecies shock adiabat. Amongst the ions the hottest upstream ion population is heated the most at the shock passage and reflects most of the entropy that is generated. Cool upstream solar wind protons in contrast will not be heated enough to become subsonic on the downstream side.