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Modelling of ion-acoustic shocks with reflected ions[1] ADRIAN HANUSCH, TATYANA LISEYKINA, University of Rostock - Insitute for Physics — In the studies of electrostatic shocks a distinction is made between electrons, that freely pass the shock structure and those that get trapped into the shock potential. If the width of the trapping region in velocity space is bigger than the change of the electron velocity by collisions over the evolution time of the trapping potential, the captured electrons are better described by the adiabatic trapping model. In the opposite case electrons remain Maxwellian. Which model is suitable in the real situation depends on how the shock is generated: adiabatic trapping is used for the shock generated in the piston tube, while Boltzmannian - in the shock tube. Recently the self-regulated ion reflection and acceleration in ion-acoustic shocks for both electron models was studied analytically [M. Malkov et al. PoP 23, 2016]. Here we present the numerical study of electrostatic shocks generated by reflection of a high-speed plasma off a conducting wall and by the decay of plasma density discontinuity. Different assumptions for the electron distribution are compared to the fully kinetic simulations. Special attention is given to the shock reflected ions. The finite ion temperature effect on the shock electrostatic structure and ion reflection efficiency is analyzed.

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