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# Characteristic scales of macroscopic fields at perpendicular supercritical shock front: impact of realistic plasma conditions.

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The ramp/foot of a collisionless shock front are well known to play a key role in the formation of energetic particles during their interaction with the nonstationary front of a supercritical perpendicular hock. Different results obtained from different simulation codes (in particular from PIC and hybrid) converge progressively towards a unified view in the dynamics of the shock front itself. However, most simulations are based on compromise in the use on realistic/nonrealistic plasma parameters (in PIC codes) or on simplifying assumptions and scalings (in Hybrid codes). The features of the shock front of a perpendicular supercritical shock are analyzed in details with the help of 1D PIC simulations via a parametric study approaching realistic conditions in terms of mass ratio, of beta-i parameter and of the ratio wpe/wce. Approaching real wpe/wce ratio represents the most difficult task because of computational constraints at present time. The present goal of the study is to analyze versus time and for different plasma conditions the variability of (i) the spatial scaling of the shock front microstructures, (ii) the overshoot amplitude features, and (iii) the cross shock electric field / potential (CSP) amplitude within the ramp which plays a crucial role (and is sometimes source of controversy when comparing with experimental data) in dissipation processes within the shock transition and in particles acceleration. Detailed results confirm the validity of previous works (in particular concerning the normalized spatial scaling of electric/magnetic macroscopic fields) based on irrealistic upstream parameters, and in addition that the self-reformation due to the accumulation of reflected ions persists quite well for realistic plasma parameters.