

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Near-wall sheath in a plasma with non-local fast electrons

VLADIMIR DEMIDOV, UES, Inc., CHARLES DEJOSEPH, JR., Air Force Research Laboratory, ANATOLY KUDRYAVTSEV, St. Petersburg State University

— It is demonstrated that the presence of a small number of fast, non-local electrons can dramatically change the thickness and electric field in the near-wall sheath. Even if the density of the non-local “fast group,” n_f , is much less than the density of the bulk electrons, n_b , ($n_f \sim 10^{-5}n_b$), the near wall potential can increase dramatically resulting in a comparable increase in the sheath thickness. Due to this low fractional density, the average energy (electron temperature, T_e) of all electrons is little changed from that of the bulk, yet the near-wall potential drop can increase to 10’s of T_e/e . More importantly, due to the non-local nature of this group of electrons, the near-wall sheath potential does not depend on T_e at all and is determined only by the energy of the fast group. In the local approximation, the near-wall sheath potential is essentially determined by the average electron energy and can be influenced by fast electrons only if they significantly alter T_e . This work was supported by The Air Force Office of Scientific Research.

Vladimir Demidov
UES, Inc.

Date submitted: 05 Jul 2005

Electronic form version 1.4