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Charge-exchange ions in a weakly collisional sheath UWE CZARNETZKI, TSANKO TSANKOV, Institute for Plasma and Atomic Physics, Ruhr University Bochum — The interaction of plasma ions with surfaces is determined by their velocity distribution function (IVDF). The IVDF is formed primarily in the sheath region in front of the surface. Here, an approximate approach is presented for a weakly collisional sheath that relies on an expansion of the ion velocity distribution function. The expansion is based on the smallness parameter sheath width to ion mean free path. With this approach the distribution function of the ions colliding in the sheath is estimated. This allows accurate prediction of various ion characteristics in the sheath (mean ion energy, effective ion temperature, ion mean velocity). Results for a floating sheath and a high-voltage sheath are presented.

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