Abstract Submitted
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Ion flux energy distributions in a hydrogen-filled drift tube at high E/N ARTHUR PHELPS, JILA, University of Colorado and NIST — Ion flux energy distributions are calculated for H^+, H_2^+, and H_3^+ ions in H_2 for low-current, uniform-electric-field drift tubes at 1 kTd $< E/N <$ 10 kTd and $5 \times 10^{20} \leq Nd \leq 3 \times 10^{21}$ m^2, where E is the electric field, N is the gas density, and d is the electrode separation. We use updated cross sections in a multi-beam model of the spatial and energy dependent particle fluxes. Calculated distributions at the cathode are compared with experiments by Rao et al.[1] and detailed theory by Bretagne et al.[2] Hypothetical large increases in the total momentum transfer cross sections for H^+ and H_3^+ at 100 to 1000 eV yield approximate fits to the relative experimental distributions at high energies at moderate E/N. However, these fitted distributions are much too small at low ion energies. Similar discrepancies occur for analytic solutions of the Boltzmann equations using simplified reaction cross sections and the almost free-fall conditions for H^+ at 10 kTd.

[1]M. V. V. S. Rao, R. J. Van Brunt, and J. K. Olthoff, ESCAMPIG '96.
[2]J. Bretagne, G. Gousset, T. Šimko, M.V.V.S. Rao, R. J. Van Brunt, Y. Wang, J. K. Olthoff, B. L. Peko and R. L. Champion, ESCAMPIG '96.

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