Experimental and Theoretical Study of Ion Velocity Distribution Functions in Two- Dimensional Velocity Space V. SOUKHOMLINOV, St. Petersburg State University, Russia, A. MUSTAFAEV, National Mineral Resources University, St. Petersburg, Russia, H. WANG, A.V. KHRABROV, I.D. KAGANOVICH, Princeton University — Ion Velocity Distribution Functions (IVDF) in two-dimensional velocity space were measured by one-sided disk probe in He, Ar, N_2, and Hg in the range of dc electric field $\frac{E}{P} \sim 10 \div 20 \frac{V}{cm\,Torr}$, where IVDF is anisotropic and strongly departs from a Maxwellian. Analytical solution of the Boltzmann equation is obtained for IVDF taking into account charge exchange and elastic scattering cross sections. IVDFs were also calculated using Monte Carlo method. Measured and simulated IVDFs agree well with analytical solution and yield known values of mobility and perpendicular and parallel diffusion coefficients.

Igor Kaganovich
Princeton University

Date submitted: 19 Jun 2015   Electronic form version 1.4