Measurement of electron drift velocity in gases

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A method to measure electron drift velocity in gases is presented. Electron transport coefficients in gases have a fundamental role in determining properties of electrical discharges.

Present experiment is performed at ambient pressure at E/n 0.13 to 1.5 Td (33-380 V/cm). Free electrons are obtained from a corona-like discharge where, in absence of electronegative gas and negative coronating electrode, the current is conducted by electrons. Electrons enter a drift tube of fixed length in short pulses controlled by an electronic shutter. Drift velocity is determined from their drift time over this tube. Drift gases used are nitrogen, argon and argon with 0.1 to 2% nitrogen admixture. Small admixtures of molecular gases are known to influence significantly properties of glow discharges in noble gases.