

CAMT Seminar

“Studies of electron transport in carbon dioxide”

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Date: December 12, 2017 (Tue) 14:00-15:00

Location: Main Conference Room (1st floor), Bldg. A12

Center for Atomic and Molecular Technologies (CAMT)

(A12 棟 1 階会議室)

Abstract:

The talk presents recent measurements of transport coefficients of electrons (bulk drift velocity, longitudinal diffusion coefficient, and effective ionization frequency) in CO₂ measured under time-of-flight conditions over a wide range of the reduced electric field, between 15 Td and 2660 Td, in a scanning drift tube apparatus [1,2]. The effective steady-state Townsend ionization coefficient is also derived from these data. These parameters are compared to the results of previous experimental studies, as well as to the results of various kinetic computations: solutions of the electron Boltzmann equation under different approximations (multiterm and density gradient expansions) and Monte Carlo simulations. The experimental data extend the range of E/N compared with previous measurements and are consistent with most of the transport parameters obtained in these earlier studies. The computational results point out the range of applicability of the respective approaches to determine the different measured transport properties of electrons in CO₂. They also demonstrate the need for further improvement of the electron collision cross section data for CO₂ taking into account the present experimental data.

[1] I Korolov, M Vass, N Kh Bastykova and Z Donkó, *Rev. Sci. Instrum.* 87, 63102 (2016)

[2] M Vass, I Korolov, D Loffhagen, N Pinhão and Z Donkó, *Plasma Sources Sci. Technol.* 26, 065007 (2017)

(Host: Satoshi Hamaguchi Ext:7913)