

# CAMT Seminar

## “Multi-Ion Species Plasmas and the Bohm Criterion”

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Date: September 30, 2022 (Friday) 16:00-17:00

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

Center for Atomic and Molecular Technologies (CAMT)

(A12 棟 1 階会議室) & Webex Link (hybrid)

### Abstract

Plasmas containing a single ion species are rather well understood. A convenient description can be provided in the frame of fluid dynamics under the additional assumption of quasi-neutrality. The latter assumption eliminates access to the natural boundary conditions at the wall. However, an effective new boundary condition is included in the fluid equations since all derivatives diverge when the ions reach their sound speed. This divergence marks the breakdown of the quasi-neutrality assumption. Conditions in plasmas containing multiple ion species are less obvious. As was shown by Benilov, also here a divergence exists. However, this divergence provides only one condition while  $N > 1$  conditions for the ions are required. These conditions will be derived. A fully-self consistent calculation requires in addition also calculation of the  $N$  ionization rates. Further, the relative plasma densities are calculated. The concept introduced here is quite recent and still in progress. Comments are very welcome.

(Host: Satoshi Hamaguchi Ext:7913)