



Contribution ID: 68

Type: Poster

## Numerical Study of Different Electron Density Observed in a Hydrogen and Deuterium Negative Ion Source Plasma

Sequences of hydrogen (H<sub>2</sub>) and deuterium (D<sub>2</sub>) experiments have been done by NIFS research and development negative ion source (RNIS) up to now. In the experiments, the co-extracted electron current with the negative ions in the D<sub>2</sub> experiment has been around three times higher than the current in the H<sub>2</sub> experiment. The electron density in the source chamber has been also higher in the D<sub>2</sub> experiment by a factor of around three (Nakano, Jpn. J. Appl. Phys., 2020). A numerical model based on rate equations for electron, positive ions, atoms and molecules which focuses on the following effects are developed in the present study; (1) isotope effect for vibrationally excited level of electronically grounded state molecules, (2) gas flow rate of mass flow controller in the experiments, (3) wall recycling ratio and (4) characteristic time of transport loss from the chamber. The difference of the electron density in the experiments is discussed from the point of view of the above effects.

### E-mail for contact person

takanori.shibata@kek.jp

### Funding Information

**Primary authors:** SHIBATA, Takanori (KEK); Mr KATO, Ryo (Keio University); NAKANO, Haruhisa (National Institute for Fusion Science); Mr HAYASHI, Katsuya (Keio University); Mr SATO, Jo (Keio University); MIYAMOTO, Kenji; HOSHINO, Kazuo (Keio University); HATAYAMA, Akiyoshi (Keio University)

**Presenter:** SHIBATA, Takanori (KEK)

**Session Classification:** Poster Session 2

**Track Classification:** Fundamental processes