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Comparison of Ion Source Plasma Response by Extraction Grid Bias Between Hydrogen and Deuterium Operation in NIFS-RNIS

A study of hydrogen isotope effects on the negative ion source supports to development of the deuterium negative ion source based on the hydrogen negative ion source for the neutral beam injector. Comparison experiments between hydrogen and deuterium have been performed with the NIFS-RNIS on the NIFS-NBTS where low voltage can be applied on the extraction grid (extraction grid bias) in deuterium operation because high extraction voltage application is limit. A larger decrease of negative deuterium ion density than that of negative hydrogen has been observed even by the extraction grid bias. Applying the extraction grid bias with positive ion extraction polarity, the negative deuterium ion density responded while the negative hydrogen ion density did not respond. Positive ion density and potential variation by the extraction grid bias with various plasma grid bias voltages will be discussed.

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