



Contribution ID: 68

Type: **Poster (by default)**

Development of a Penning Gauge Ion Source with a Filament for a Compact Ion Microbeam System

A penning ion source with a filament has been developed for a compact ion microbeam system to form sub-micron ion beam. A duoplasmatron-type ion source has, so far, been used for the system. However, the duoplasmatron-type ion source is large power consumption as well as a large size. It is an obstacle to reduce the size of the system. As an ion source to overcome the demerits, a penning gauge ion source, as referred to "PIG ion source", is a candidate of a suitable ion source for the system. If a typical PIG ion is used, the usage of its source is difficult to form a microbeam. Therefore, a PIG ion source has been developed the system. The key feature of the ion source is beam energy spread to form a submicron beam width. The spread is caused by discharge voltage to generate plasma in the ion source. One of the methods to generated the plasma is the usage of a filament. Thus, a PIG ion source with a filament has mainly developed in this study. In the presentation, the features of the developed PIG ion source will be reported.

Acknowledgement

This study is supported by JSPS KAKENHI Grant Numbers JP20H00145, JP20H02673, and Moonshot R&D Grant Number JPMJMS2062.

Funding Agency

JST, JSPS

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Session Classification: Monday

Track Classification: Beam Formation, Extraction, Transport, and Diagnostics