COLD CATHODE PENNING ION SOURCE

Model SO-60

Features

- High yield of multiply charged ions
- Low power consumption
- Long lifetime
- Low beam emittance
- Beam currents in the range of
  10 - 150 µA for singly charged ions
  1 - 15 µA for doubly charged ions
- Easy operation and maintenance

General description

The Model SO-60 cold cathode penning ion source is the HVEE version of the Frankfurt PIG ion source. The SO-60 ion source combines simplicity, low power consumption and long lifetime with a high yield of multiply charged ions. This makes the SO-60 ion source ideally suited for research applications in which a large variety of multiply charged ions are required on a routine basis.

The SO-60 ion source has been designed in such geometry that a low pressure plasma can easily be maintained without a hot filament.
The ionization chamber consists basically of an anode cylinder and two cathode rings facing both ends of the anode. By means of a relatively high discharge voltage and an axial magnetic field, a plasma is created from which the ions are extracted through one of the cathode rings.
This high discharge voltage and the low operating pressure make the SO-60 ion source especially suited for the production of multiply charged ions from gases.

Spare parts to cover the first needs are included with each SO-60 ion source.

Other types of penning ion sources available from High Voltage Engineering are:
The Model SO-90 Sputter Penning Ion Source for sputtering of solid materials
The Model SO-100 Hot Cathode Penning ion source

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SPECIFICATIONS

. Typical beam currents as measured on the target of a 400 or 500 kV HVEE ion implantation system for energies between 80 - 400/500 keV and with 30 kV extraction voltage

Ion	Current (μA)	Ion	Current (μA)
$^{1}H^{+}$	10	$^{40}Ar^{+}$	150
$^{2}H_{2}^{+}$	100	$^{40}Ar^{2+}$	15
$^{4}He^{+}$	150	$^{40}Ar^{5+}$	50 nA
$^{4}He^{2+}$	2	$^{84}Kr^{+}$	70
$^{12}C^{+}$	25	$^{84}Kr^{2+}$	8
$^{12}C^{2+}$	1	$^{84}Kr^{6+}$	50 nA
$^{14}N^{+}$	80	$^{129}Xe^{+}$	20
$^{14}N^{2+}$	2	$^{129}Xe^{2+}$	5
$^{16}O^{+}$	65	$^{129}Xe^{6+}$	50 nA
$^{16}O^{2+}$	3		

. Beam emittance : < 3 π mm mrad $(MeV)^{½}$

. Energy spread : approx. 60 eV

POWER REQUIREMENTS

Anode power supply : 10 kV / 10 mA DC
Magnet power supply : 10 V / 30 A DC
Extraction power supply : 20 - 30 kV / 5mA DC
Cooling : 50 m^3 air per hour

The Model SO-60 ion source normally operates at +/- 30 kV with respect to (terminal) ground. Therefore the source must be insulated from (terminal) ground. The source power supplies must be connected to a 30 kV isolation transformer.