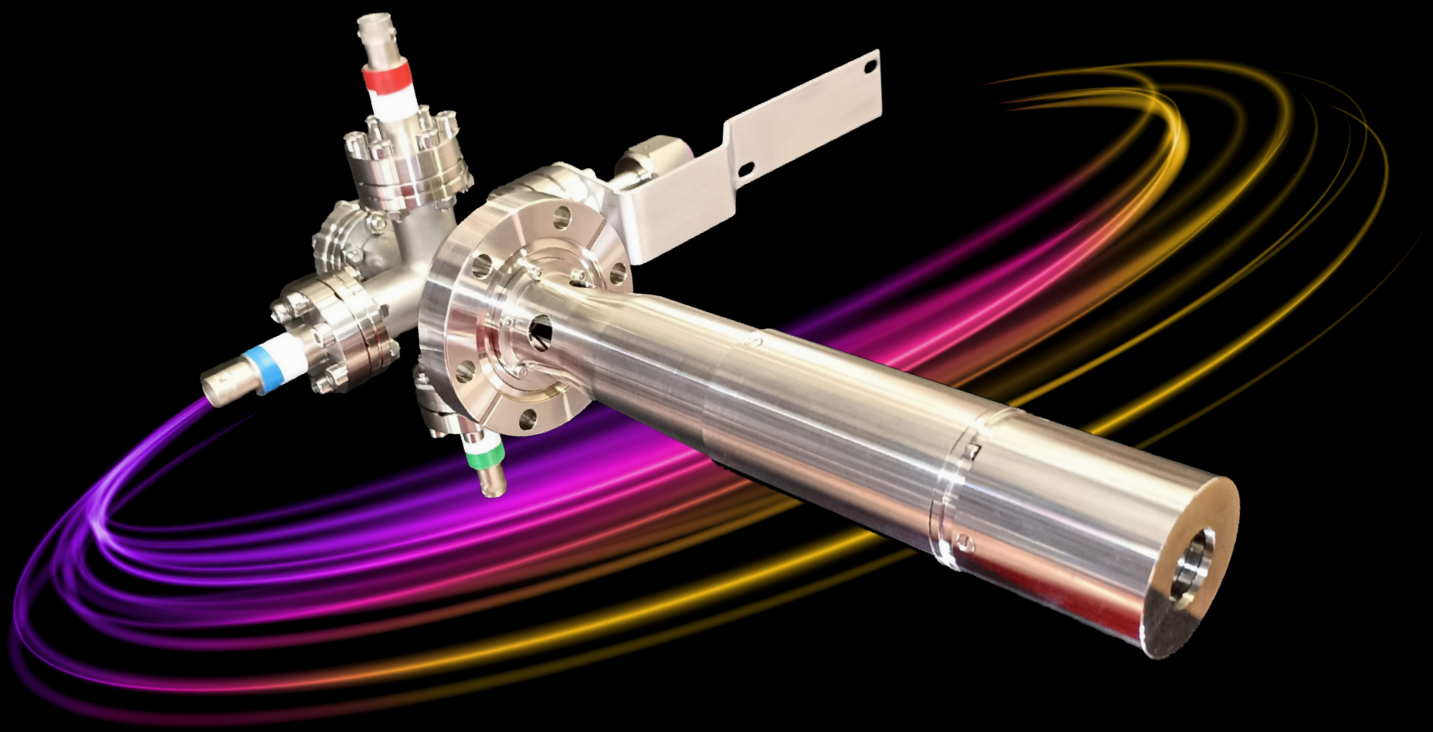
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TES-40

HIGH BRIGHTNESS WITH EINZEL LENS

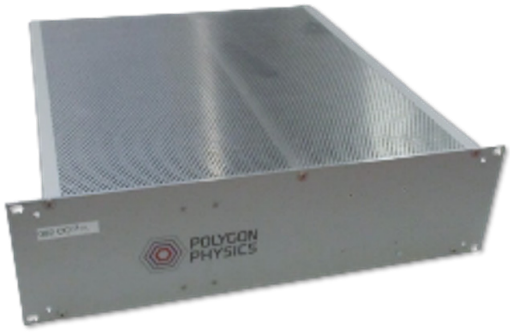
Etching • Figuring • Sputtering • Surface Activation • Beam Line

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TES-40 HIGH BRIGHTNESS WITH EINZEL LENS

TES-40 GENERAL CHARACTERISTICS

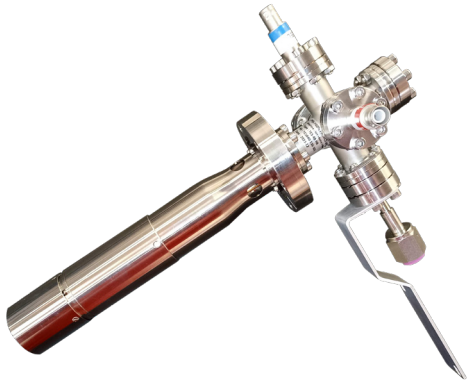
Discharge	ECR filament free
Gas	H_2, He, N_2, O_2, noble gas, molecular gas
Microwave power typ. (2.45 GHz)	0.5 to 5 W
Maximum Energy	5 kV
Diameter in vacuum	36 mm
Flange type	CF40
Cooling	None
Cable length outside vacuum	2 m Option: 5 m
Electronics	Two 19" racks : Control command (inc.HF) and HV
Hardware control	API available via Microcontroller
Communication protocol	Ethernet UDP, RS232
User interface	GUI executable (ethernet UDP only)
Source gas control	Mass-Flow Controller (MFC)





TES-40-IONS HIGH BRIGHTNESS

Applications	Etching, figuring, sputtering, surface activation, beam line
Energy range	0.5 – 5 kV
Current	10 to 500 µA
Current density	Typ. 50 to 100µA/mm^2
Beam size (typ. at 4 cm)	0.3 to 15 mm
Insertion depth	188 mm with Einzel
Option	Pulsed mode, bipolar mode, neutralizer, longer cables

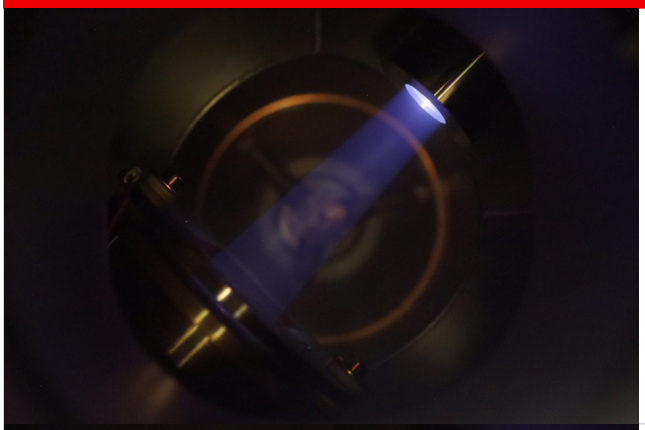


BEAM EXTRACTION CASES

Example : Ar extraction at 4 kV

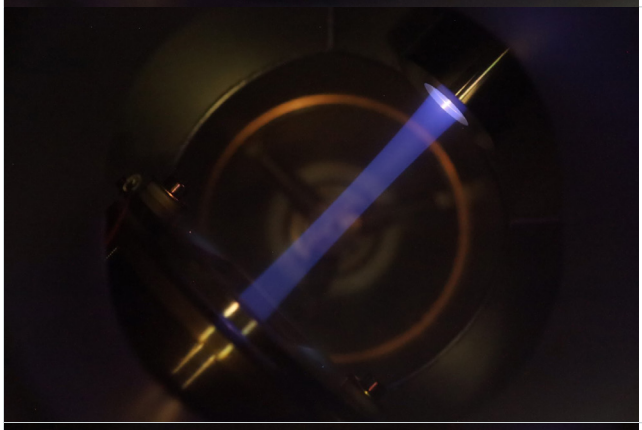
SOURCE PARAMETERS	
Gas flux (sccm)	0.3
Pressure (mbar)	5.30E-006
U_{beam} (kV)	4
HF Power (W)	3.0
I_{beam} (µA)	420

BEAM SHAPE CONTROL WITH EINZEL LENS



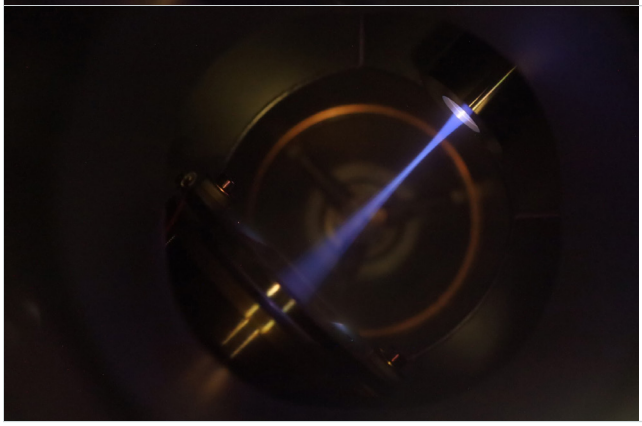
Divergent beam

U_{Einzel} 2.8 kV
Measured spot size at 2cm: 16.8mm
Current density at 2cm: 2µA/mm²



Parallel beam

U_{Einzel} 3.5 kV
Measured spot size at 2cm: 8mm
Current density at 2cm: 9µA/mm²



Focused beam

U_{Einzel} 3.9 kV
Measured spot size at 2cm: 1.8mm
Current density at 2cm: 160 µA/mm²

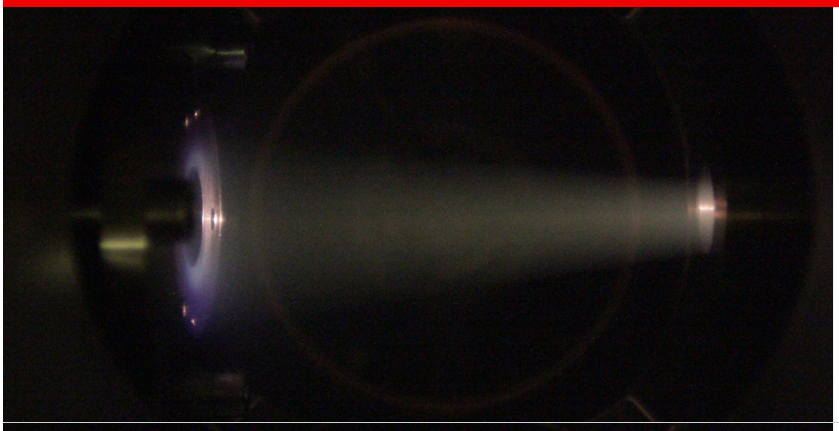
Actual working point/data on system delivered may be different depending on user's environment.

BEAM EXTRACTION CASES

Example : He extraction at 5 kV

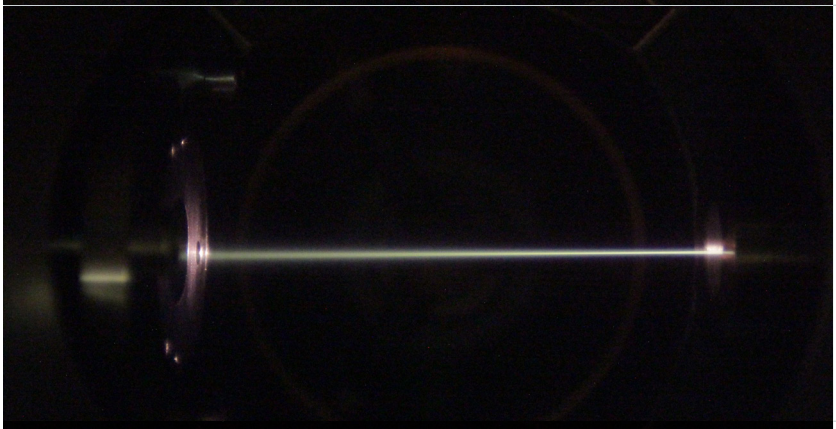
SOURCE PARAMETERS	
Pressure (mbar)	6.4E-5
U_{beam} (kV)	5.0
HF Power (W)	5.0
I_{beam} (µA)	10.5

BEAM SHAPE CONTROL WITH EINZEL LENS



Divergent beam

Gas flux 2sccm
U_{Einzel} 4 Kv
U_{focus} 2kV
Measured spot size at 72mm: 23mm
Current density at 72mm: 0.53 µA/mm²



Parallel beam

Gas flux 2sccm
U_{Einzel} 4.4 kV
U_{focus} 5kV
Measured spot size at 72mm :1.4mm
Current density at 72mm: 6.82 µA/mm²

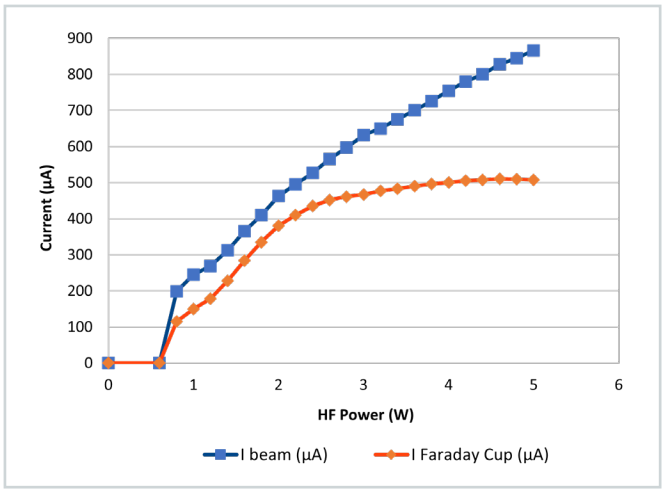


Focused beam

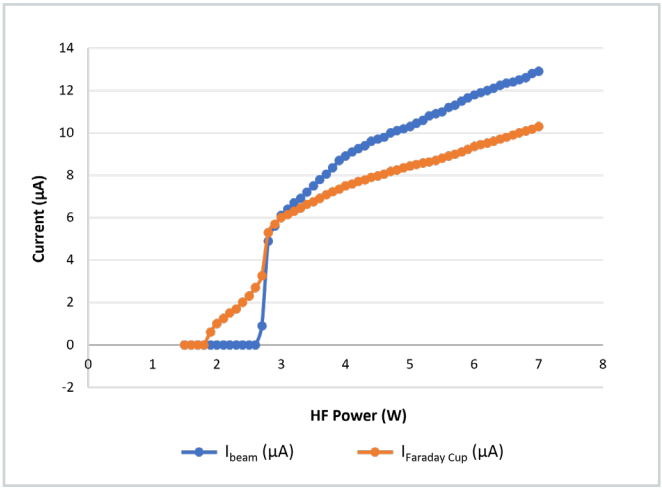
Gas flux 2.5 sccm
U_{Einzel} 4.4 kV
U_{focus} 1kV
Measured spot size at 72mm: 0.5 ± 0.5mm
Current density at 72mm: 53.50 µA/mm²

Actual working point/data on system delivered may be different depending on user's environment.

BEAM CURRENT TUNING WITH HF POWER

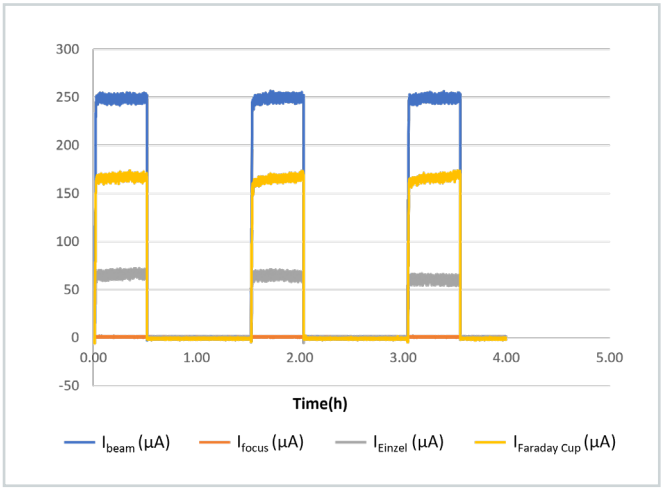


Ar - 3mm extraction electrode



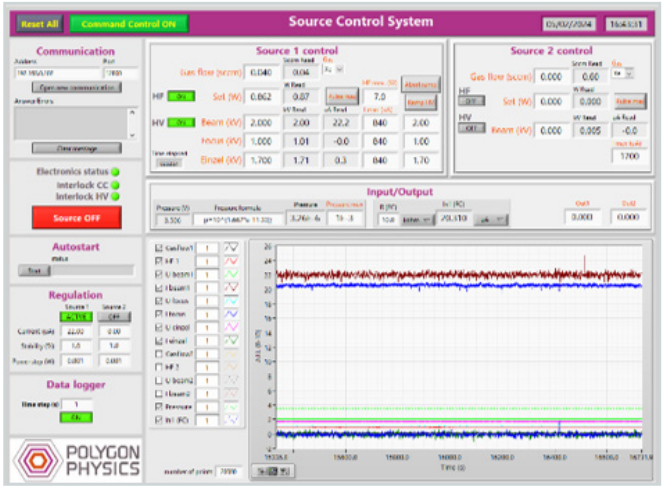
He – 0.5mm extraction electrode

AUTOSTART & REPRODUCIBILITY

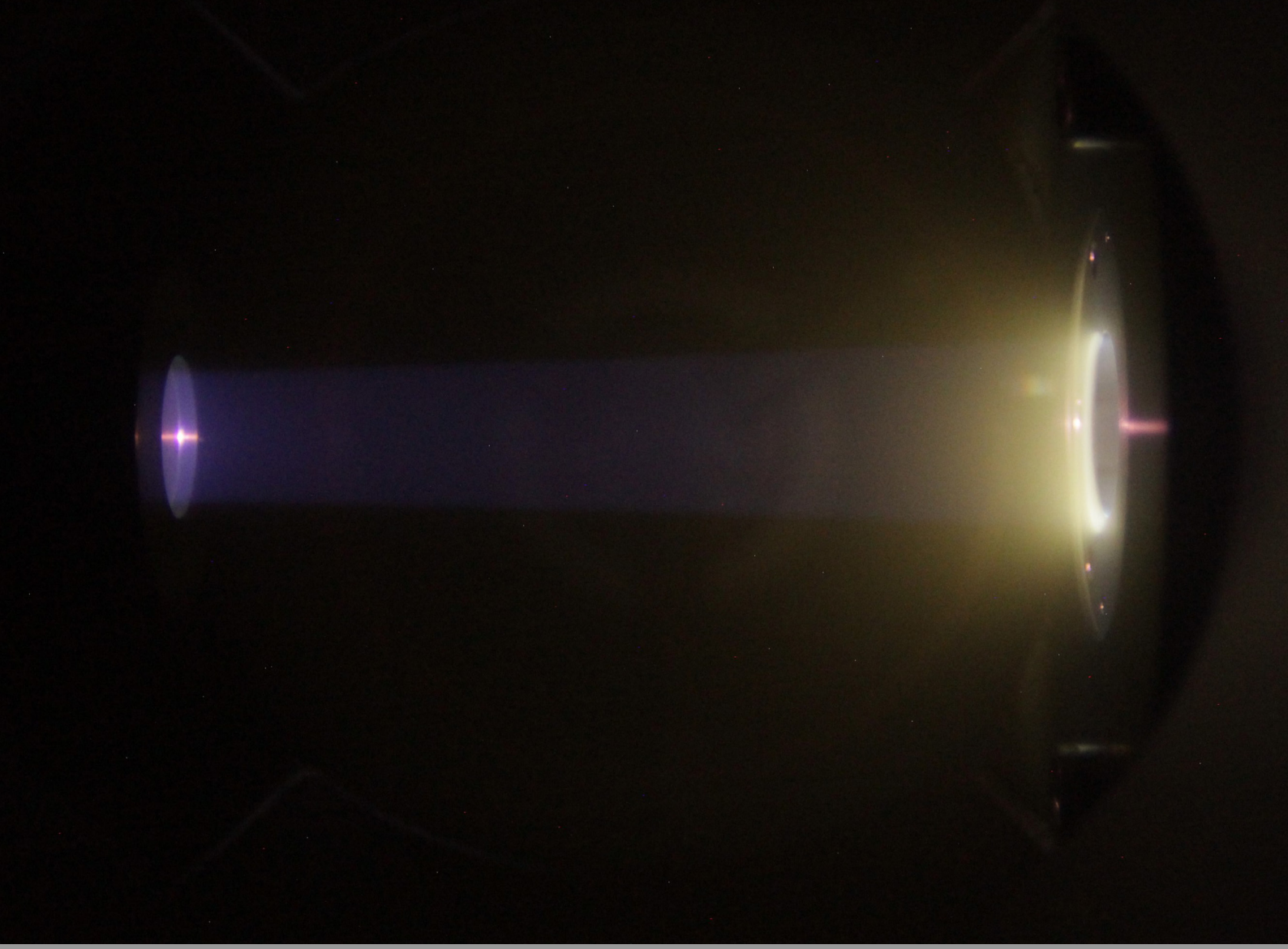


3 successive autostarts - Reproducibility test

GUI SOFTWARE



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