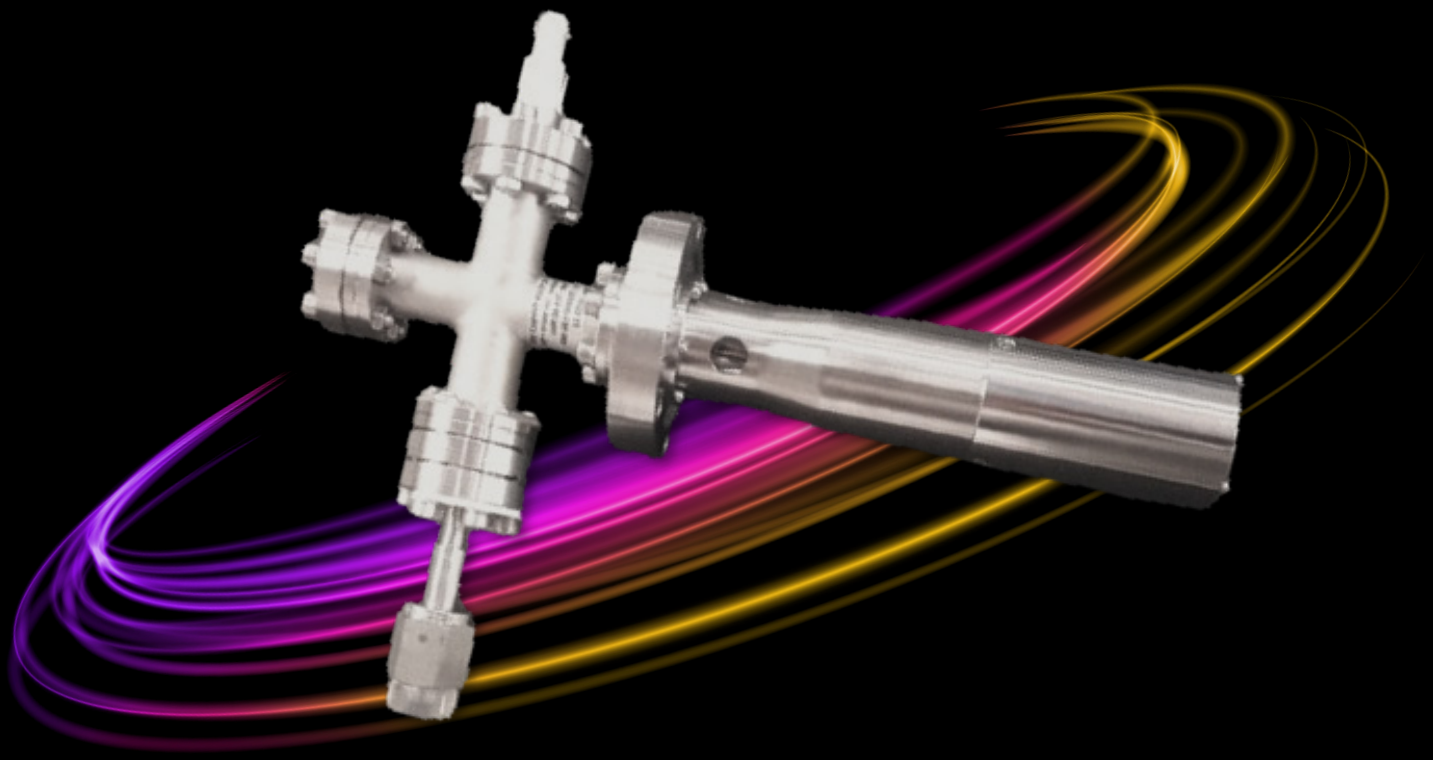
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TES-40

ELECTRON SOURCE / NEUTRALIZER

Neutralization • Electron Chemistry • Surface Modification

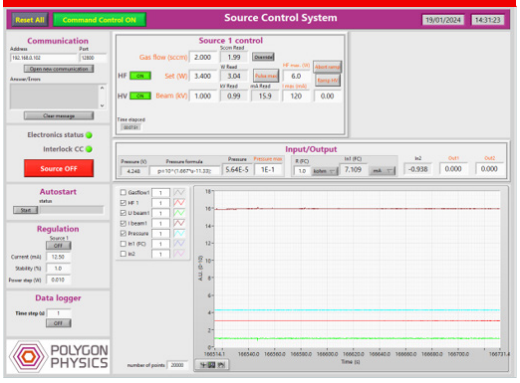
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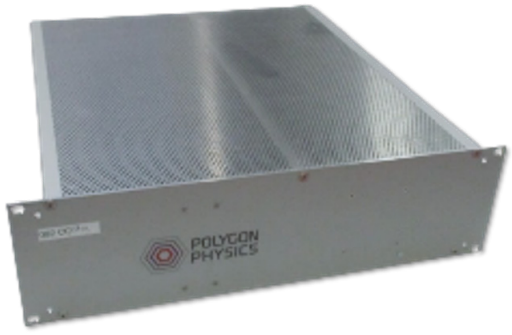
TES-40 ELECTRON SOURCE/NEUTRALIZER

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	36.5 mm
Flange type	CF40
Cooling	None
Cable length outside vacuum	2 m Option: 5 m
Electronics	One or 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)

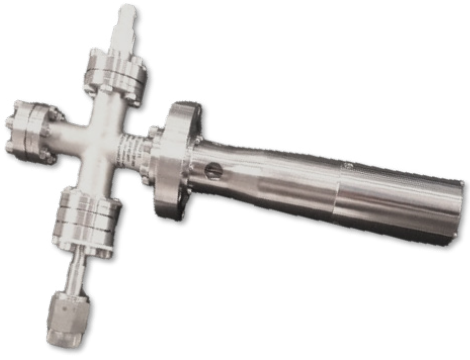
GUI SOFTWARE





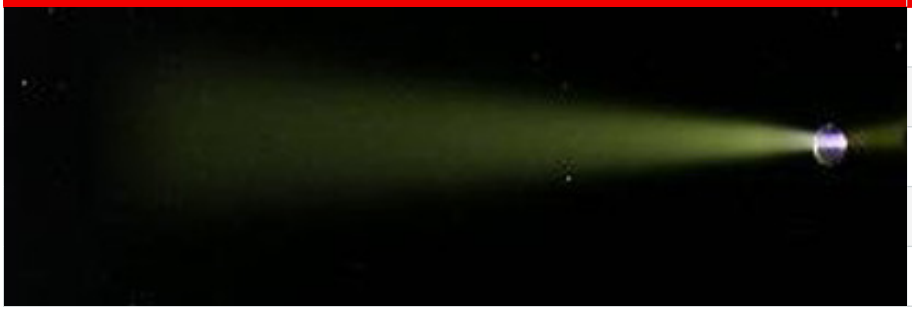
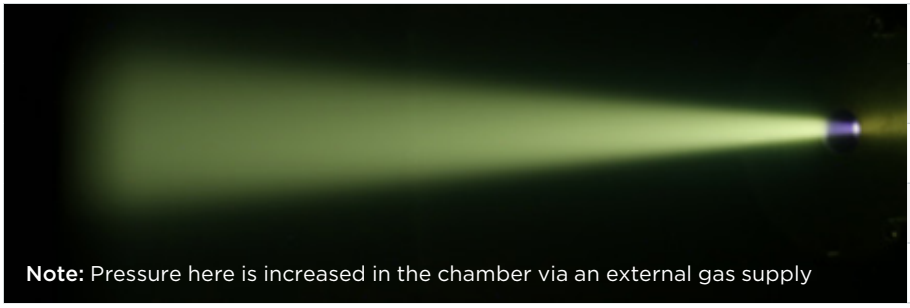
TES-40-ELECTRONS/NEUTRALIZER

Applications	Neutralization, electron chemistry, surface modification
Energy range	0.1 – 5 kV
Current	0.1 to 50 mA
Power	Low-power 60 W max Mid-power 200 W max
Beam size (typ. at 4 cm)	3 - 30 mm
Insertion depth	140 mm/188 mm with Einzel
Option	Einzel lens, longer cables, pulsed mode

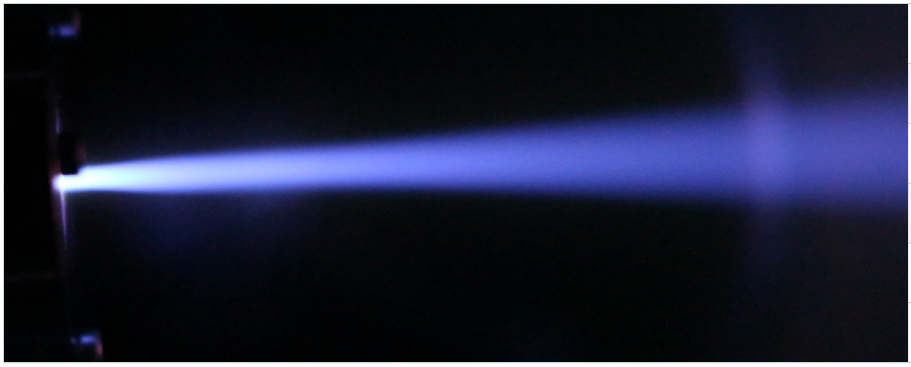


BEAM EXTRACTION CASES

Example : 50W electron beam (from O_2 plasma)

BEAM SHAPE	SOURCE PARAMETERS	
	**Gas flow (sccm)**	2
	Pressure (mbar)	6E-5
	U_{beam} (kV)	4
	HF Power (W)	2.33
	I_{beam} (mA)	12.5
 **Note:** Pressure here is increased in the chamber via an external gas supply	**Gas flow (sccm)**	0.8
	Pressure (mbar)	1E-2
	U_{beam} (kV)	4
	HF Power (W)	2.38
	I_{beam} (mA)	12.5

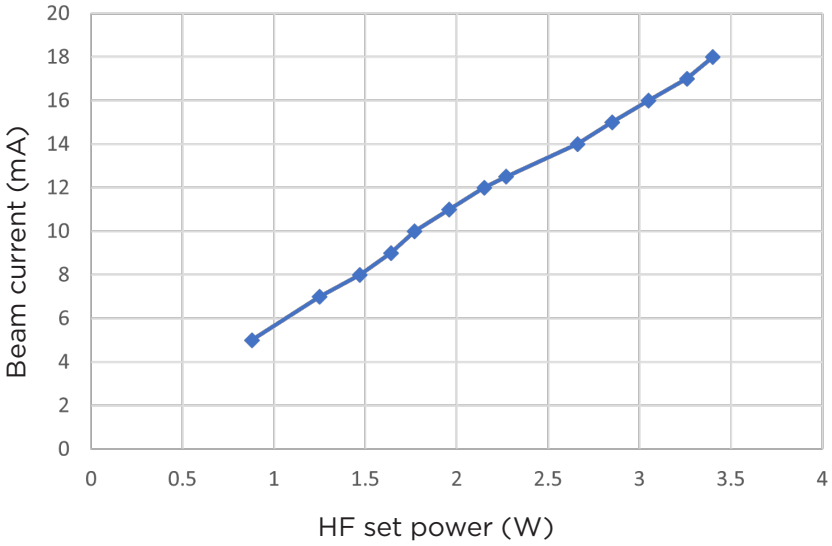
Neutralizer – Electrons (from Ar plasma)

BEAM SHAPE	SOURCE PARAMETERS	
	**Gas flow (sccm)**	0.04
	Pressure (mbar)	3.1E-6
	U_{beam} (V)	300
	HF Power (W)	0.85
	I_{beam} (mA)	0.6
	$I_{Faraday\ Cup}$ (µA)	420
	**Gas flow (sccm)**	0.04
	Pressure (mbar)	3.1E-6
	U_{beam} (V)	100
	HF Power (W)	2
	I_{beam} (mA)	1.4
	$I_{Faraday\ Cup}$ (µA)	720

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

BEAM CURRENT TUNING WITH HF POWER

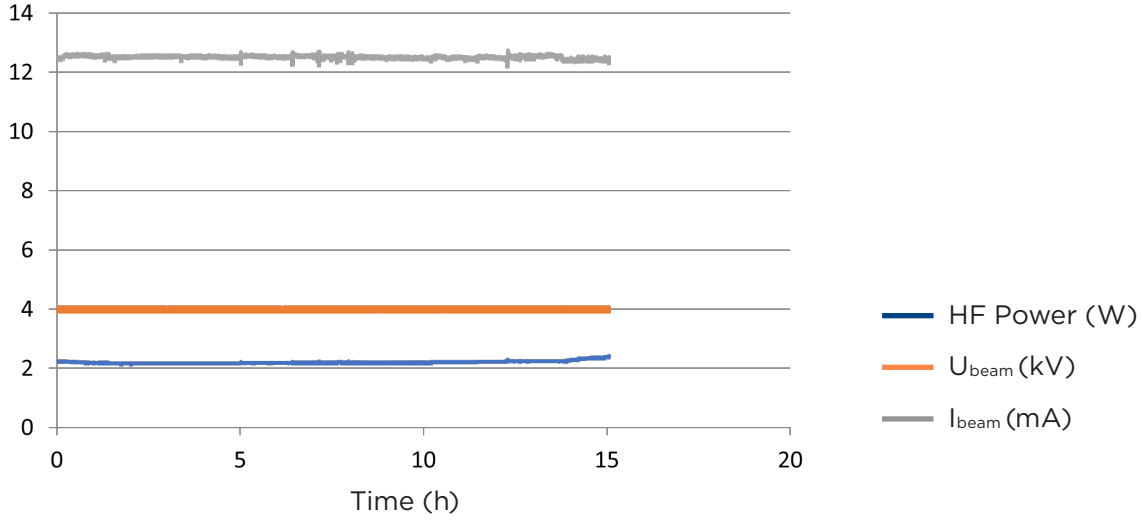
Example : Electrons (from O_2 plasma) | 2.5mm extraction electrode



BEAM LONG-TERM STABILITY

Example : Electrons (from O_2 plasma) | 2.5mm extraction electrode

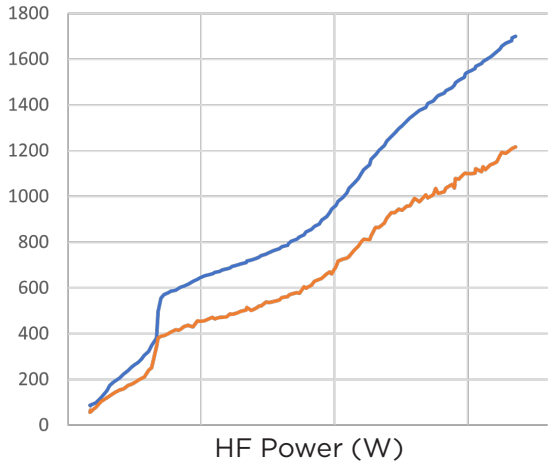
P = 1E-2 mbar



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

BEAM CURRENT TUNING WITH HF POWER

Example : Electrons (from Ar plasma)



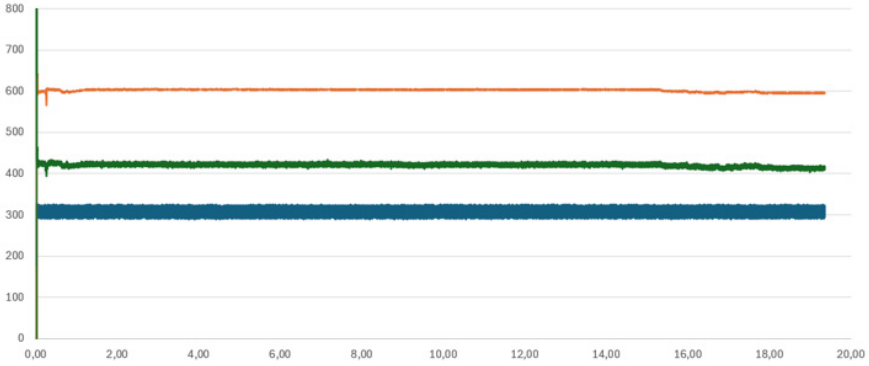
SOURCE PARAMETERS	
Gas flow (sccm)	0.04
Pressure (mbar)	3.1E-6

I_{beam} (µA) (neg)

$I_{Faraday\ Cup}$ (µA) (e-)

BEAM LONG-TERM STABILITY (WITH HF POWER REGULATION)

Example : Electrons (from Ar plasma)



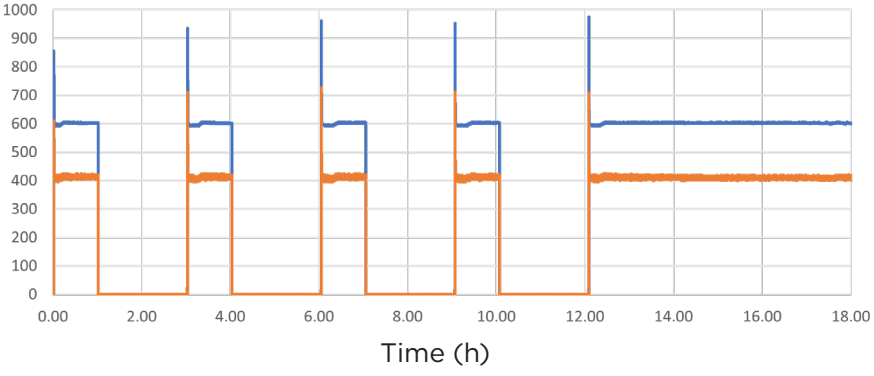
U_{beam} (V)

I_{beam} (µA)(neg)

$I_{Faraday\ Cup}$ (µA) (e-)

AUTOSTART AND REPRODUCIBILITY

Example : Electrons (from Ar plasma)



I_{beam} (µA)

$I_{Faraday\ Cup}$ (µA) (e-)

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



CAMECA (Corporate Headquarters)
29 Quai des Grésillons
92622 Gennevilliers Cedex - France
Tel: +33 1 43 34 62 00
cameca.info@ametek.com

CAMECA Source Technology Center
19 rue de Sassenage
38600 Fontaine - France
Tel: +33 4 80 42 09 06

CAMECA Atom Probe Technology Center
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