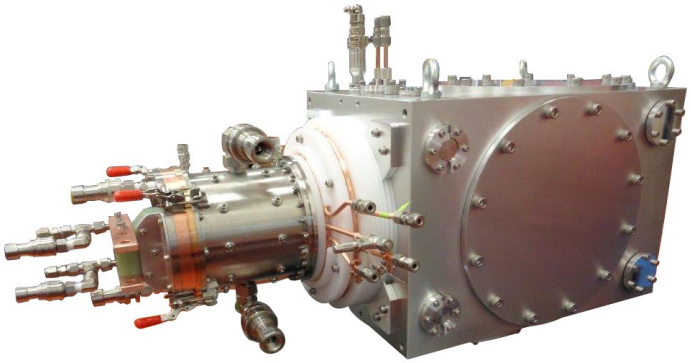
FILAMENT POWERED TURNKEY NEGATIVE ION SOURCE SYSTEM

ISV.F-040

D-Pace

TRIUMF-licensed, DC, volume-cusp

- Yields 15mA DC H^-, and 5mA DC D^-
- Low maintenance with long filament lifetime (> 5250 mA·hours)
- Negligible lens wear due to the optimized lens ion-optics, and low emittance
- Internal steering magnet enables beam alignment corrections
- Instrumentation options include Faraday cup, emittance scanner, beamlines, beam profiler and mass spectrometer



Ion Source with Vacuum Box

ION	Beam Current (mA)	Beam Energy (keV)
H^-	0-15	20-30
D^-	0-5	20-30

Beam Intensities for Various Ions

SPECIFICATION: ISV.F-040	
ION SOURCE	
Particle Type	H^-, D^-
Beam Kinetic Energy	20 to 30 keV
Normalized 4rms Emittance	< 1 mm·mrad
Beam Purity	> 99%
Filament Lifetime	> 5250 mA·hours
Beam Current Stability	± 1% over 24 hours
POWER SUPPLIES	
Max Bias Supply	40mA, 30 kV
Arc Supply	50 A, 200 V
Filament Supply	400 A, 10 V
Plasma Lens	42 A, 20 V
Extraction Lens	150 mA, 8 kV
X & Y Steering Magnet	10 V, 10 A
VACUUM SYSTEM SPECIFICATIONS	
Turbo Pumps, 1X Upstream & 1X Downstream	1700 l/s Flange ISO250F
Dry Scroll Roughing, 1X Upstream & 1X Downstream	35 m^3/hr
GAS FLOW	
Mas Flow Controller	11-30 sccm
CONTROLS	
Control PLC	Phoenix Contact ILC, Ethernet
User Interface Options	D-Pace standalone or OPC command library for customer integration
High Voltage Interlocks	HV grounding relay with access control locks
COOLING WATER, DEIONIZED, 20˚C (>1.0 MOhm.cm)	
Source Body	8.0 LPM, 40 PSI (275 kPa)
Filament	1.0 LPM, 70 PSI (480 kPa)
Back Plate	1.5 LPM, 70 PSI (480 kPa)
Plasma Lens	1.5 LPM, 70 PSI (480 kPa)
Extraction Lens	1.5 LPM, 70 PSI (480 kPa)
XY Steering Magnet	1.0 LPM, 70 PSI (480 kPa)

Tune Data for Maximum Beam Current:		
	IONS	
	H^-	D^-
Max. Beam Current (mA)	**18**	**6.0**
Bias Supply (mA, kV)	25, 30	8.9, 30
Arc Supply (A,V)	48, 120	38, 120
Filament Supply (A,V)	35, 0.89	87, 158
Plasma Lens Supply (A,V)	21, 3.8	27, 5.7
Extraction Lens Supply (mA, kV)	130, 3.8	100, 2.7
Steering Magnet X (A)	0.82	3.50
Steering Magnet Y (A)	1.6	0.0
H_2 (sccm)	20	15
Vacuum, Ion Source (Upstream) (10^{-5} Torr)	4.6	4.7
Vacuum, V-Box (Downstream) (10^{-6} Torr)	6.2	2.4
½ Beam Diameter at Waist (mm)	2.7	2.3
½ Beam Divergence at Waist (mrad)	34.4	49.4
Geometric 4rms Emittance (mm·mrad)	94	110
Normalized 4rms Emittance (mm·mrad)	0.75	0.90

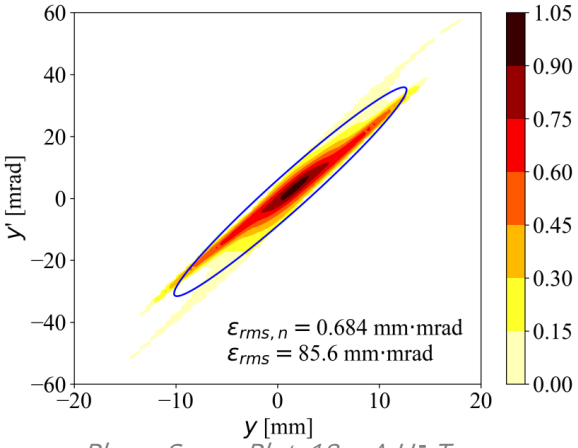
The ISV.F-040 Filament Ion Source system is a complete, turnkey ion source system including:

- Ion source & vacuum box
- Vacuum system & gauges
- Power supplies, PLC controls & software
- Low voltage and high voltage racks
- 40 kV isolation transformer
- Interlocks and HV grounding system
- User interface & Ethernet-based remote controls
- Ion source stand
- Personnel access control interlocks
- Water flow gauges and interlocks
- Mass flow controller for feed gasses

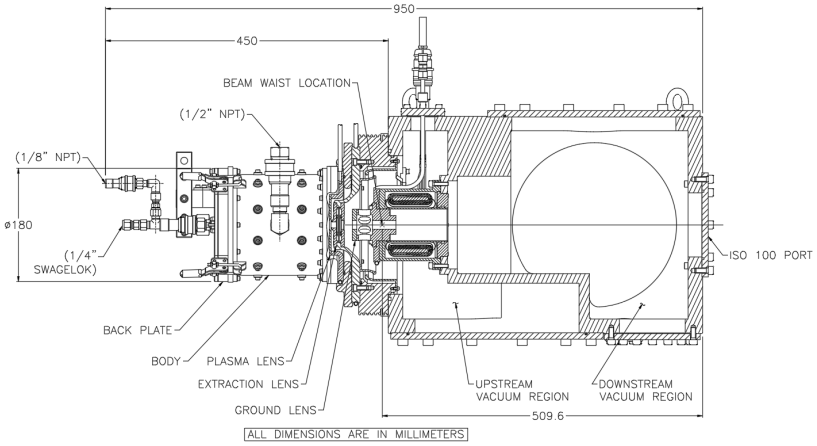
Optional:

- High-voltage Faraday cage/ enclosure
- Water de-ionization and cooling system
- Sliding Faraday cup
- UniBEaM fiber optic beam profile monitor
- TRIUMF-licensed emittance scanner
- 1:500 mass spectrometer with slits

Enquire about other negative and positive ion beams, and our RF-powered ion sources



Phase Space Plot, 18 mA H^- Tune



Turnkey Filament-Powered Ion Source Including Optional Beamline and Mass Spectrometer

1. D-Pace reserves the right to update specifications as part of its ongoing product improvement program.