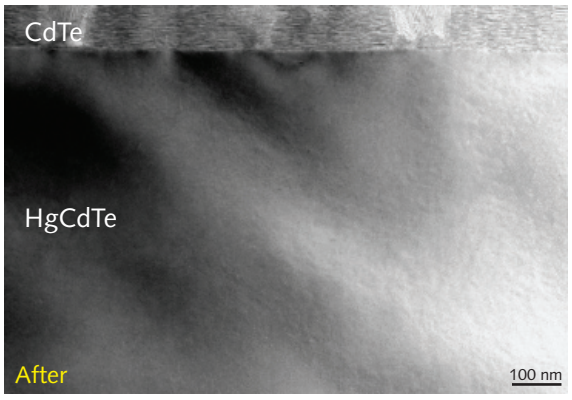
Precision Ion Polishing System (PIPS™)

Model 691

The PIPS™ ion mill is a user-friendly, tabletop Precision Ion Polisher System designed to produce high quality, TEM specimens with large electron transparent areas. The PIPS™ incorporates patented Whisperlok® stage, 2 unique penning ion guns with 10° to -10° milling angles, variable energy milling (down to 100eV), liquid nitrogen specimen cooling and an oil-free vacuum system for ultra-clean specimen processing.

Features	Benefits
Patented pneumatic Whisperlok® stage	No need to vent the chamber to load/unload samples, sample exchange < 1 min
Patented sample holders and loading mechanism	For double sided milling at low angle
2 unique penning ion guns	No consumable parts and lifetime > 30,000 hrs
Beam modulation offering both single and double sector milling	• Minimizes contamination and allows sample cool down • High milling rates at shallow angles to less than 1 degree
Variable energy milling: 100eV to 6.0keV	• Minimizes radiation damage and sample heating • Produces large and clean electron transparent areas • Exceptionally fast milling even at angles below 4 degrees
LN2 specimen cooling	• Eliminates artifacts • High Throughput - Cool down time 10 minutes (reaches -100 °C) and warm up time (before venting) 10 minutes
CCD camera for "real-time" video monitor imaging (optional)	• Superior fringe enhancement • Increases specimen throughput • Reduces or eliminates over-milling • Reduces specimen handling



Images: LN2 specimen cooling to eliminate artifacts. Image of HgCdTe/CdTe heterostructure sample doped with Hg (80%) and CdTe (20%). Top: Sample prepared at room temperature showing numerous defects in HgCdTe layer. Bottom: Sample prepared in Gatan PIPS™ with cold stage - showing HgCdTe layer completely free of any ion-milling defects. Images courtesy of Dr. Dave Smith and Dr. Changzhen Wang, Arizona State University, AZ, USA.

Specifications

Ion Source	
Ion Guns	Two Penning ion guns with rare earth magnets
Milling Angle	+10° to -10°, each gun independently adjustable
Ion Beam Energy	100eV to 6.0keV
Beam Diameter	350 µm FWHM at 5keV - 800 µm FWHM at 5keV for broad beam guns
Ion Current Density	10mA/cm² Peak
Beam Alignment	Precision beam alignment using fluorescent screen
Beam Diameter	Adjustable using gas control
Specimen Stage	
Sample Size	3mm or 2.3mm
Mounting	Gatan patented DuoPost® (standard) or Graphite Holder (optional)
Rotation	Variable from 1 to 6 rpm
Beam Modulation	Single or double sector for exceptional cross-sectioning
Viewing	Binocular microscope 40x or 80x. CCD imaging with 17" LCD monitor 300x - 2200x (optional)
Vacuum	
Dry Pumping System	Two stage diaphragm pump backing a 70 l/sec turbo drag pump
Pressure	$5x10^{-6}$ torr base pressure, $8x10^{-5}$torr operating pressure
Vacuum Gauge	Cold cathode type for main chamber. Solid-state for backing pump
Specimen Airlock	Gatan Whisperlok®, specimen exchange time < 1 min
Dimensions and Utilities	
Overall Size	560mmW x 480mmD x 430mmH (22"W x 19"D x 17"H)
Shipping Weight	45kg (100lbs)
Power Consumption	200 Watts during operation, 100 Watts with guns off
Power Requirements	Universal 100VAC - 240VAC, 50/60hz (user to specify voltage and frequency)
Gas	Argon gas at 25 psi (1.72 bar)

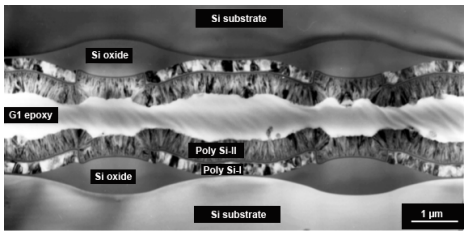
Note: Specifications are subject to change.

Ordering information

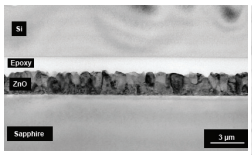
Model	Description
691	Precision Ion Polishing System (PIPS™)
691.CS	New PIPS™ ion mill with cold stage Whisperlok® and electronic temperature controller
691.CS.UPG	Customer installed upgrade package to add sample cooling to an existing PIPS™

Please consult with your local sales representative for details regarding spares and consumables.

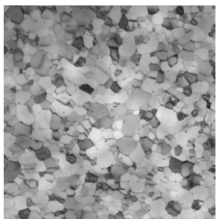
Primary applications



Semiconductor



Metals (oxide)



Metals (alloy)

Ceramics

Images: Semiconductor: Double cross-section of semiconductor sample ion milled with dual beam modulation. Metals (oxide): Cross-section image of a ZnO_2 on sapphire wafer. Metals (alloy): Al-Cu metallization layer thinned on Si substrate. Ceramics: Bulk type ceramic specimen SiC/Al_2O_3.

we get it!

www.gatan.com

ISO 9001 BUREAU VERITAS Certification

Certified Quality Management System

Gatan Inc. Corporate Office/ Western USA Sales
5794 W. Las Positas Blvd.
Pleasanton, CA 94588 USA
tel +1.925.463.0200
fax +1.925.463.0204
info@gatan.com

Eastern USA Sales
780 Commonwealth Dr.
Warrendale, PA 15086 USA
tel +1.724.776.5260
fax +1.724.776.3360
info@gatan.com

Gatan UK
25 Nuffield Way
Abingdon Oxon
OX14 1RL United Kingdom
tel. +44.0.1235.540160
fax. +44.0.1235.540169
ukinfo@gatan.com

Gatan GmbH
Ingolstädterstr. 12
D-80807 München Germany
tel +49 89 358084-0
fax +49 89 358084-77
mfelsmann@gatan.com

Gatan France
3bis, Chemin du Haut Breuil
78113 Grandchamp France
tel +33.1.34944407
GSM +33.6.80135139
fax +33.1.34871668
dmonville@gatan.com

Nippon Gatan
3F Sakurai bldg. 2-8-19
Fukagawa, Koto-ku Tokyo
135-0033 Japan
tel +81.3.5639.2772
fax: +81.3.5639.2763
rabara@gatan.com

Gatan Singapore
10 Eunos Rd. 8 #12-06
Singapore Post Centre
Singapore 408600
tel +1.65.6408.6230
fax +1.65.6293.3307
wchuang@gatan.com