

## Equipment List

SYSTEM	TOOL NAME	TOOL DESCRIPTION	VENDOR	LOCATION	CONNECTION TO QUIC
<b>UNIVERSITY OF WATERLOO</b>					
Diamond Blade saw	ALLIED-xtal-cut-R1	Precision slow saw	Allied High Tech	RAC1 - RM1013	DF
Diamond wire saw	WIRETEC-wire-saw-R1	Diamond wire saw	Diamond WireTec	RAC1 - RM1013	DF
Sample polisher	ALLIED-polish-R1	Sample polisher	Allied High Tech	RAC1 - RM1013	DF
Lapper	Lapper-R1	Large sample lapper/polisher	Engis	RAC1 - RM1013	DF
Plasma cleaner	PLASMAETCH-plasmaclean-R1	Plasma cleaner O2 AR	Plasma Etch	RAC1 - RM1013	DF
Micro assembly station	MITUTOYO-scope-R1	Optical Microscope with Micromanipulators	Mitutoyo	RAC1 - RM1013	C DF DT
HF Acids Only	WB-HFACID-R1	HF Wetbench	Reynoldstech	RAC1 - RM1013	DF
Acids & Bases non HF	WB-ACIDBASEnonHF-R1	Acids & Bases Wetbench	Reynoldstech	RAC1 - RM1013	DF
Solvent Processing	WB-SOLVENT-R1	Flammables fume hood	Mott Manufacturing	RAC1 - RM1013	DF
Optical microscope	LEITZ-scope-R1	General purpose microscope	Leitz	RAC1 - RM1013	C
Laser Welder	ROFIN-welder-R1	Small sample laser welder	Rofin	RAC1 - RM1013	DF
Optical microscope	EVOVISION-scope-R1	Long working distance optical microscope	Evovision	RAC1 - RM1013	C DF
Wirebonder: Manual Wedge	WESTBOND-wirebond-R1	Wirebonder Au Al	West-bond Inc.	RAC1 - RM1013	DF
Thermal Cycling chamber	TESTEQUITY-TChamber-R1	Thermal cycling chamber, -70 +200°C	TestEquity	RAC1 - RM1013	DT
Cleanroom assembly station	AssemblyStation1-R1	Cleanroom assembly station, ESD safe	Custom	RAC1 - RM1013	DF
	AssemblyStation2-R1	Cleanroom assembly station	Custom	RAC1 - RM1013	DF
Profiler	BRUKER-contour-R1	Optical profiler, VSI PSI	Bruker Instruments	RAC1 - RM1013	C
Atomic force microscope	VEECO-AFM-R1	AFM	Veeco Instruments	RAC1 - RM2003	C
Optical microscope	ZEISS-scope-R1	Optical Microscope	Zeiss	RAC1 - RM2003	C
LPCVD CNT	ANGSTROM-LPCVD-R2	LPCVD, CH4, H2, carbon nanotube, graphene	Angstrom Engineering	RAC2 - RM2021	G
Glass processing station	VYTRAN-splicer-R2	Fiber optic processing station	Vytran	RAC1 - RM1013	DF
PLD Oxides	TSST-PLD-R2	Pulsed laser deposition system	Twente Solid State Technology	RAC2 - RM2031	G
Inert atmosphere lab	Inert-AngstromEvap-R1	Thermal Evaporator, 4 Source, Glovebox	Angstrom Engineering	RAC1 - RM2003	G
	Inert-WB-Solvents-R1	Fumehood for spin, clean, develop, lift-off	Mott Manufacturing	RAC1 - RM2003	DF
	Inert-WB-Acidbase-R1	Fumehood for general acid and base processing	Mott Manufacturing	RAC1 - RM2003	DF
	Inert-General-R1	General purpose workstation		RAC1 - RM2003	DF
	Inert-Glovebox-R1	Glovebox workstation with Plasma etcher, SEM with EBL, and optical microscope	Various equipment vendors	RAC1 - RM2003	DF
Electron spin resonance	EMX	X-band, CW ESR	Bruker Instruments	RAC2 - 1124	C A
Transport measurement	12T He-3 refrigerator	DC transport @ .3-300K	Janis Cryogenics	RAC2 - 1011	C DT
	20T dilution refrigerator	DC transport @ .01-4K	Oxford Instruments	RAC2 - 1218	C DT
Susceptometry	VSM	Susceptometry @ 2-300K	Lakeshore Cryotronics	RAC2 - 1017	C

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Scanning-Tunneling Microscope	LT STM	STM and AFM @ 2-300K	Omicron	RAC2 - 1124	C				
Nuclear spin resonance	NMR	300MHz solid NMR @ 2-300K	Bruker Instruments	RAC2 - 1121	C				A
ARPES	ARPES	ARPES @ 2-300K	Omicron	RAC2 - 1007	C				
Transport measurement	Probe station	Cryogenic RF probe station	Janis Cryogenics	RAC2 - 1002	C		DT		A
Electron spin resonance	Elexys	X-band, pulse and CW ESR	Bruker Instruments	RAC2 - 1124	C				A
Machining	Waterjet	2'x4' Waterjet cutter	OMAX	RAC2 - 1120			DF		
XRD	D8 Discover X-ray	High Resolution XRD single crystals	Bruker	RAC2-2112	C				
MBE system	MBE	UHV-cluster MBE system	Scienta Omicron	RAC2-2031	G	C			
	MOX-MBE	Metal oxide MBE growth	Scienta Omicron	RAC2-2031	G				
	TI-MBE	Topological insulator MBE growth	Scienta Omicron	RAC2-2031	G				
	M-MBE	Metal MBE growth	Scienta Omicron	RAC2-2031	G				
	SC-sputtering	Superconducting sputtering deposition	Scienta Omicron	RAC2-2031	G				
	M-Sputtering	Magnetic material sputtering deposition	Scienta Omicron	RAC2-2031	G				
	Analysis module	XPS, UPS, AES	Scienta Omicron	RAC2-2031		C			
Sputter: Twin Chamber	AJA	Sputtering and e-beam deposition	AJA International	RAC2-2021	G				
CVD: Si nano wires	CVD	Chemical vapor depositor	CVD Equipment Corp	RAC2-2021	G				
CVD: Diamond	Seki Diamond	Diamond CVD growth	Seki Diamond Systems	RAC2-2021	G				
ALD/PECVD Cluster	OXFORD-cluster	Deposition of various thin films via ALD or PECVD	Oxford Instruments	QNC-1701			DF		
Evaporator: Al Superconducting films	PLASSYS-Ebeam	PVD of Aluminum via e-beam evaporation for Josephson Junction fabrication	Plassys	QNC-1701			DF		
Evaporator: E-beam	ANGSTROM-Ebeam	PVD of thin films via e-beam evaporation	Angstrom Engineering	QNC-1701			DF		
Evaporator: E-beam & thermal	INTLVAC-Ebeam	PVD of thin films via e-beam & resistive-heating thermal evaporation	Intlvac	QNC-1701			DF		
Evaporator: Thermal	ANGSTROM-Thermal	PVD of thin films via resistive-heating thermal evaporation	Angstrom Engineering	QNC-1701			DF		
LPCVD LTO	TYSTAR4-LTO	Low temperature oxide & doped oxide deposition via LPCVD	Tystar	QNC-1701			DF		
LPCVD Poly Si	TYSTAR3-PolySiC	Deposition of doped & undoped films of Polysilicon via LPCVD	Tystar	QNC-1701			DF		
LPCVD Silicon Nitride	TYSTAR2-nitride	Low stress silicon nitride deposition via LPCVD	Tystar	QNC-1701			DF		
Oxidation	TYSTAR1-atm	Wet or dry thermal oxidation and thermal anneal	Tystar	QNC-1701			DF		
Rapid Thermal Processor #1	ALLWIN-RTP	Short duration, high-temperature processing of 4" or 6" wafers	Allwin21 Corp.	QNC-1701			DF		
Rapid Thermal Processor #2	ALLWIN-RTP2	Short duration, high-temperature processing of 4" or 6" wafers	Allwin21 Corp.	QNC-1701			DF		
Sputter: Nb Superconducting Films	PLASSYS-sputter	PVD of superconducting films of Nb	Plassys	QNC-1701			DF		
Sputter: Twin Chamber	AJA-sputter	PVD of thin films via sputter deposition	AJA International	QNC-1701			DF		
Beamer/Tracer Software Package	BEAMER	Software for e-beam lithography	GeniSys GmbH	QNC-1701			DF		
E-Beam Litho 30kV	RAITH-EBL	Nanometer-scale patterning via electron-beam lithography	Raith Nanofabrication	QNC-1701			DF		

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E-Beam Litho 100kV	JEOL-EBL	Nanometer-scale patterning via electron-beam lithography	JEOL USA	QNC-1701	DF
Mask Aligner: Front/Back Capable	SUSS-align	Alignment and UV exposure of resist-coated wafers	Suss MicroTec	QNC-1701	DF
Wafer Bonder	SUSS-bond	Permanent bonding of two blank or patterned substrates	Suss MicroTec	QNC-1701	DF
Oven: Convection	FISHER-oven	Baking of various photoresist films	Thermo Fisher Scientific	QNC-1701	DF
Oven: HMDS & Image Reversal	YES-HMDS	Coating substrates with adhesion promoter prior to photoresist coat	Yield Engineering Systems	QNC-1701	DF
Spin Coat: Dual general purpose	REYNOLDSTECH-twincoater	Spin coating of various photoresist thin films	Reynoldstech	QNC-1701	DF
Spin Coat: E-Beam Resist Station	BREWER-Ebeamspinbake	Spin coating of E-beam photoresist films	Brewer Science	QNC-1701	DF
Spin Coat: UV Resist Station	BREWER-UVspinbake	Spin coating of photoresist films	Brewer Science	QNC-1701	DF
UV Direct Write	HEIDELBERG-MLA	Alignment and UV exposure of resist-coated wafers	Heidelberg Instruments	QNC-1701	DF
Ion Mill	AJA-ionmill	Etching of thin films via Ar ion milling	AJA International	QNC-1701	DF
Photoresist Stripper	YES-ash	Photoresist strip & descum	Yield Engineering Systems	QNC-1701	DF
RIE: Deep Si	OXFORD-SIRIE	Plasma-based dry etching of silicon	Oxford Instruments	QNC-1701	DF
RIE: Metals & III-V	OXFORD-metalRIE	Plasma-based dry etching of metal thin films and III-V substrates	Oxford Instruments	QNC-1701	DF
Bulk Silicon Etch	REYNOLDSTECH-bulkSi	Wet bulk silicon etch via solutions of KOH	Reynoldstech	QNC-1701	DF
Critical Point Dryer	TOUSIMIS-CPD	Critical point drying of membranes and cantilevers after release	Tousimis	QNC-1701	DF
Diffusion Pre-Clean	RCACLEAN	Wafer clean via RCA chemistries	Reynoldstech	QNC-1701	DF
E-Beam Resist Develop	DEVELOPEBL	Development of E-Beam resists	Reynoldstech	QNC-1701	DF
HF Acids Only	HFACID	Bulk wet silicon oxide etch via solutions of HF	Reynoldstech	QNC-1701	DF
Non-HF Acids & Bases	ACIDBASEnonHF	Dedicated to acid or base processes and cleans. HF is NOT permitted in this hood.	Reynoldstech	QNC-1701	DF
Piranha Organics Clean & Resist Strip	PIRANHA	Removal of hardened photoresists & general substrate cleans	Reynoldstech	QNC-1701	DF
Solvent Processing #1	SOLVENT1	Wet bench dedicated to the use of solvent-based chemicals ONLY	Reynoldstech	QNC-1701	DF
Solvent Processing #2	SOLVENT2	Wet bench dedicated to the use of solvent-based chemicals ONLY	Reynoldstech	QNC-1701	DF
UV Resist Develop	DEVELOPUV	Development of UV resists	Reynoldstech	QNC-1701	DF
4-point probe	CDE-4pp	Tool for measuring resistivity of metals and doped semiconductors	Creative Design Engineering Inc.	QNC-1701	DF
Bruker Icon/Fastscan AFM	BRUKER-AFM	Scanning probe microscopy	Bruker	QNC-1701	DF
Electrical Probe Station	EVERBEING-probe	Probe station	Everbeing International Corp.	QNC-1701	DF
Electrical Probe Station	SUSS-probe	Probe station	Suss MicroTec	QNC-1701	DF
Ellipsometer	WOOLLAM-ellip	Non-destructive optical characterization of thin films	J.A. Woollam Co.	QNC-1701	DF
JEOL JSM-7200F Scanning Electron Microscope	JEOL-SEM	Scanning Electron Microscopy of semiconductor samples	JEOL USA	QNC-1701	DF
LatticeAx Cleaving Tool	Cleaving tool	Manual cleaving of substrates	LatticeGear	QNC-1701	DF

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Microscope #1	OLYMPUS-scope1	Semiconductor microscope for inspecting and documenting	Olympus Canada	QNC-1701	DF
Microscope #2	OLYMPUS-scope2	Semiconductor microscope for inspecting and documenting	Olympus Canada	QNC-1701	DF
Reflectometer: Thin Film Mapping	FILMETRICS-F50	Tool for mapping transparent thin film thickness	Filmetrics	QNC-1701	DF
Reflectometer: Thin Film Spot Measurement	FILMETRICS-F40	Tool for spot-measuring transparent thin film thickness	Filmetrics	QNC-1701	DF
SEM Sample Coater	LEICA-coater	Vacuum film deposition instrument for FE-SEM applications	Leica Microsystems	QNC-1701	DF
Surface Profiler	BRUKER-profilometer	Stylus surface profiler	Bruker	QNC-1701	DF
	VEECO-profilometer	Stylus surface profiler	Bruker	QNC-1701	DF
Wafer Stress Measurement	TOHO-stress	Tool for measuring thin film stress	TOHO Technology	QNC-1701	DF
Convection Cure Oven	Cureoven	Baking of various epoxies/packages in ambient atmosphere	Carbolite	QNC-1706	DF
Dicing Saw	DISCO-saw	Dicing of thin substrates into smaller pieces	DISCO	QNC-1706	DF
Die Bonder	TRESKY-diebond	Bonding of semiconductor dies to packages	Tresky	QNC-1706	DF
Epoxy Dispenser	NORDSON-epoxy	Epoxy encapsulation of electronic dies in packages	Nordson	QNC-1706	DF
H2 Plasma Cleaner	LFC-plasmaclean	Cleaning prior to die bonding, wire bonding or encapsulation	Samco-UCP	QNC-1706	DF
Measurement Microscope	OLYMPUS-scope3	Inspection & dimensional measurement of semiconductor dies	Olympus Canada	QNC-1706	DF
Wirebonder: Manual Wedge/Ball	WESTBOND-wirebond1	Making electrical contacts between semiconductor dies and packages	West-Bond Inc.	QNC-1706	DF
Wirebonder: Semi-automatic Wedge	WESTBOND-wirebond2	Making electrical contacts between semiconductor dies and packages	West-bond Inc.	QNC-1706	DF
Wire Pull Tester	WESTBOND-pulltest	Verifying mechanical strength of wire bonds	West-Bond Inc.	QNC-1706	DF
Contact Angle Goniometer	RAMEHART-contactangle	Measurement of contact angle of solution droplets on a surface	Ramé-Hart Instrument Co.	QNC-1508	DF
Diamond Scriber	OEG-scriber	Precision cutting of monocrystalline materials	OEG	QNC-1508	DF
Hood: Acids & Bases Chemical Processing	FUMEHOOD-south	Wet bench dedicated to (non-HF) acids and bases ONLY. NO solvents and NO HF solutions permitted.	Mott Manufacturing	QNC-1508	DF
Hood: Solvents Chemical Processing	FUMEHOOD-north	Wet bench dedicated to the use of solvent-based chemicals ONLY (no exceptions!)	Mott Manufacturing	QNC-1508	DF
Zeiss Auriga 40 SEM/FIB	ZEISS-SEM-FIB	TEM sample preparation and precision micro-milling	Zeiss	QNC-B711	DF
JEOL JEM-F200 S/TEM with EELS	JEOL-TEM	Scanning/Transmission Electron Microscope with EELS	JEOL USA	QNC-B709	C

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SYSTEM	TOOL NAME	TOOL DESCRIPTION	VENDOR	LOCATION	CONNECTION TO QUIC		
<b>UNIVERSITÉ DE SHERBROOKE</b>							
Variable temperature liquid helium refrigerator	VariTemp	Liquid helium refrigerator with variable temperature (4.2K-300K)	Janis	D2.0066	C	DT	A
Closed loop dilution refrigerator	LD 250	10mK dilution refrigerator	BlueFors	D2.0066		DT	A
	LD 250 optomechanics	10mK dilution refrigerator with optical access and vibration isolation	BlueFors	D9.0009		DT	A
Closed loop refrigerator fast cycle	DRYice 1.5K	50mm diameter variable temperature refrigerator (1.5K-800K)	ICEoxford	D9.0006	C	DT	A
Large capacity closed loop dilution refrigerator	XLD400	10mK large capacity dilution refrigerator	BlueFors	D9.0008		DT	A
Cryogenic probe station	Cryotronics CPX-VF	Cryogenic probe station(liquid helium), DC, RF & MW, 4.2K-400K with 2.5T magnet	LakeShore	D9.0010	C	DT	A
Optical table	Optical table	Fully equiped optical table for quantum optics	Various	D9.0010	C	DT	A
	Teraflash Pro THz	Pulsed THz source	Toptica	D9.0010	C	DT	A
	Multiharp 150-4P	Time correlator 5ps	PicoQuant	D9.0010	C	DT	A
	LDH-FA	Pulsed 532nm laser	PicoQuant	D9.0010	C	DT	A
	Janis	Liquid helium refrigerator 4K	Janis	D9.0010	C	DT	A
Cryogenic system for characterization of physical properties	Dynacool PPMS	Physical property measurement system, 1.9K-400K, 14T magnet	Quantum Design	D9.0011	C	DT	A
<b>UNIVERSITY OF BRITISH COLUMBIA</b>							
Density functional theory cluster	LISA	Local Computer Cluster	Custom	UBC Data Centre			A
	LISA2	Local Computer Cluster	Custom	UBC Data Centre			A
Quantum Materials and Devices Foundry (QMDF)	GENxplor 1	MBE for Chalcogenides	Veeco	QMI 473	G		
	GENxplor 2	MBE for Oxides	Veeco	QMI 473	G		
	PLD System	Oxide thin films	Neocera	QMI463	G		
Low-temperature fabrication facility for van der Waals	AFM	Dedicated for 2D mat	Bruker	AMPEL 346	C		
	Glove box	Integrated LN2 stage	Mbraun	AMPEL 346	C		
	Microscope	Glove box integrated	Zeiss	AMPEL 346	C		
Structural, magnetic, and (super)conducting properties characterization suite	Dynacool PPMS x3	14T max field	Quantum Design	AMPEL 242	C	DT	
	MPMS3	7T max field	Quantum Design	AMPEL 242	C	DT	
	MPMS	5.5T field	Quantum Design	AMPEL 242	C	DT	
	D8 Discover X-ray	Powder diffraction	Bruker	AMPEL 243	C		
	D8 Discover X-ray	Single crystal diffraction	Bruker	QMI 473	C		
	MWL120	Real Time Laue Camera	MultiWire Laboratories Ltd	QMI 479	C		
ARPES	ARPES Analyzer	High Resolution Electron Analyzer	Custom system with Scienta analyzer	CLS	C		
	Spin ARPES Analyzer	High Resolution Electron Analyzer	Custom system with Scienta analyzer	CLS	C		
	ARPES Analyzer	High Resolution Electron Analyzer	Custom system with Scienta analyzer	QMI 479	C		
	VUV Laser	Time resolved ARPES	Custom	QMI 479	C		
	XUV Laser	Time resolved ARPES	Custom	QMI 479	C		

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Quantum Materials Electron Microscopy Center (QMEMC)	Vacuum Suitcase	UHV sample transport system	Ferrovac	QMI 479	G	C			
	NION STEM	Energy/momentum optimized	NION	QMI 61D		C			
	FIB	8-inch wafer capable	Tescan	QMI 63		C			
Design, fabrication, and testing of quantum electronic devices and qubits	UHV evaporator	Ebeam(6), DC & RF Sputter (4)	AJA International	Brim 446 white	G				
	DeeDirectors evaporator	Ebeam(8)	Custom	Brim 449	G				
	NxQ4006	Mask aligner	Neutronix Quintel	Brim 446 ISO6Y			DF		
	MLA150	Maskless Lithography	Heidelberg	Brim 446 ISO5Y			DF		
	JBX-8100FS	E-beam Lithography	JEOL	QMI 065			DF		A
	ICP	Etcher dedicated for Silicon	Oxford	Brim 446 white			DF		
	ECR Etcher	Dedicated	Astex/PlasmaQuest	Brim 449			DF		
	RIE Etcher	Etcher for superconducting devices (Fluorine)	SAMCO	Brim 446 white			DF		
	XeF2 Etcher	Dedicated	Xactix	Brim 446 white			DF		
	PE-50	Plasma etcher	Plasma Etch Inc.	Brim 446 white			DF		
	PECVD	Deposition/etching	Trion	Brim 446 white	G		DF		
	Wetbench 8ft	Acids/dangerous chemicals	Air Control Microvoid	Brim 446 white			DF		
	Wetbench 8ft with 12in spinner	EBL and related lithography	Air Control Microvoid	Brim 446 ISO5Y			DF		
	Wetbench 8ft with 6 in spinner	Electronic/MEMS lithography	Air Control Microvoid	Brim 446 ISO6Y			DF		
	Wetbench 8ft - general purpose	Cleaning/clean workspace	Microzone	Brim 449			DF		
	Dektak	XT profilometer	Bruker	Brim 446 white		C			
	Nanosurf AFM	High-resolution	Nanosurf AG	Brim 446 white		C			
	F20	Reflectometer	Filmetrics	Brim 446 ISO6Y		C			
	SR-4	Four point probe station	SR-4	Brim 446 white					DT
	Muffle furnace	1000 C	MTI	Brim 449			DF		
	Die bonder	Pick 'n place tool	Tresky	Brim 449			DF		
	TPT wire bonder	Automatic wirebonder	TPT	Brim 449			DF		
	DAD3240	Dicing saw	Disco	Brim 449			DF		
	Photonic Wire Bonder	2 photon 3D lithography	Vanguard	Brim 446 ISO6Y			DF		
	Microscope	Bright/dark field, R & T modes	Nikon	Brim 446 ISO6Y		C			
	Microscope and camera	Bright/dark field, DIC	Nikon	Brim 446 ISO5Y		C			
	LD250	Cryo-free Dilution Refrigerator	BlueFors	Brim 111					DT
Quantum Engineering Control System	Modular Qubit Control & Measurement	Keysight	Brim 111					DT	