Annexure C
Technical Specifications of LT-STM components

This section will describe all technical specifications of the components used in LT-STM system. Common specifications among the components if otherwise stated.

Extreme operating temperature range	5°C/41°F to 40°C/104°F
Typical operating temperature range	20°C/68°F to 25°C/77°F
Relative humidity	Less than 80% for Temperature up to 31°C/88°F or
Maximum allowed main supply voltage fluctuations	±10%

C.1 Tip Etching kit

This section will cover the technical details about the custom-made tip etching kit. All the details are extracted from the manuals of sub-components and requirement of process

Name of feature	**Description**
Type of Transformer used	Center tapped
Input Transformer Voltage	220V AC, 50 Hz
Output Transformer Voltages	24V, 12V, 0V
Output transformer Current	1A

C.2 e-beam evaporator

This section will provide technical specifications of e-beam evaporator used in LT-STM system. The information is grabbed from instrument manual.

Name of feature	**Description**
Mains input voltage	100-240V AC, 50, 60 Hz
Maximum Power Consumption (Mains input)	450W
High Output Voltage	0-1000V, 300mA
Output ION suppressor	1200V, 25µA
Output Filament current	0-5A, Max 16V
Flux Monitor Output	±10V (150Ω Impedance)
Sample Current Output	±10V (150Ω Impedance)
Aux Output	0-10V (150Ω Impedance)
Shutter Power	Max 5V, Pulses 1msec @ 5V
Shutter Status	TTL-Signal (CMOS)
Flux monitor input	Max ±10mA
Input flux monitor ranges	0-10.2nA, 6.5nA-102nA, 65nA-1.02µA, 0.65µA-10.2µA, 6.5µA-102µA, 65µA-1.02mA, 0.65mA-10.2mA
Aux input	0-10V

Thermocouple input	Max ca 80mV
RS232/Focus Bus	Interfaces for remote control
Interlock	Switching input for interlock, connect to ground to indicate normal operation.
Case	Desk top power supply (19" rack mount possible)
Width	84TE (448.6 mm)
Height	2U (88 mm)
Depth	305 mm
Weight	5 kg
e-beam energy	0-1000eV
Typical e-beam energy	600-800eV
e-beam power	Max power 300W, max current 300mA
Filament current	1.8-2.2A (typical), 2.5A (maximum)
Maximum bakeout temperature	250°C
Maximum number of crucibles	3
Cooling water flow	> 0.5 l/min at T ≈ 30°C, max. pressure = 6 bar
Temperature range with rod evaporation	300° up to 3300°C, depends on size of evaporant (heat loss)
Temperature range with Ta-, Mo- or W-crucible	300° - 2000°C
Temperature range with Knudsen crucible (stainless steel)	160°C - 800° C
Rod diameter	0.5 -6 mm, depending on maximum temperature to be reached, standard Mo clamp accepts up to 1.5 mm diameter.

C.3 Tip preparation tool

This section includes technical specification of in-situ tip preparation tool usable under UHV conditions.

Name of feature	**Description**
Filament Material	Thoriated Tungsten
Maximum emission current	3mA
Separation between tip and filament	1mm or less
Positioner range	25mm
Mains power connection	110/115V and 230V input selectable
Filament supply output	15V, 0-3A
High voltage output	1kV, 10mA

C.4 RF Sputtering

This section illustrates technical specification of in-situ RF sputtering system.

Name of feature	**Description**
Operating beam energy range	300eV to 5 keV
Beam current	25µA @ 500eV, 80µA @ 5keV
Maximum operating chamber pressure	$8x10^{-5}$ mbar
Minimum chamber pumping speed	200 l/sec
Power supply	90-264 VAC, 47-63 Hz
Filament supply output	15V, 0-3A

High voltage output	1kV, 10mA
Cathode supply	4kV
Focus supply	-1 to +5 kV
Operating temperature	0 to +45°C
Storage temperature	-35 to +85°C

C.5 Crystal Monitor

This section illustrates technical specification of in-situ crystal monitor system.

Name of feature	**Description**
Thickness display range	0 to 999.9 kÅ
Thickness Resolution	1Å
Rate display range	0 to 999 Å/sec
Rate resolution	0.1Å/sec
Measurement period	0.25 sec
Sensor type	Quartz crystal microbalance
High voltage output	1kV, 10mA
Frequency	6MHz
Maximum frequency shift	1MHz
Film parameter	9 materials
Number of films	1 to 9
Material density	0.5 to 99.99 gm/cc
Material Z factor	0.1 to 9.999
System tooling	10 to 399%
Shutter closure	0 to 9999 kÅ
Thickness setpoint	0 to 9999 kÅ
Timer setpoint	0 to 99:59 M:S
Input connection	15 PIN D MALE
Hardware output	4, SPST 2.5A Relays
Hardware input	4 TTL Comp., active low
Analog recorder	±10V F.S. rate or thickness, 2mA max load, 11-bit resolution
Power requirement	120/240V, +5% to 20%, 50/60 Hz, 10VA
Temperature range	0 to 50°C (operating), -15 to 65°C (storage)