

### List of items likely to be procured in the next 3-5 years

#### NOTE:

**A. This list may change from time to time depending on project requirements.**

**B. Detailed specifications will be available at the time of raising the indent.**

1. MS and SS chambers with refractory and thermal insulation linings from inside like in a furnace.
2. IGBT based power supply of rating 100kW
3. Process Instrumentation and sensors with PLC based feedback controls integrated in control panel.
4. Steam based medical waste sterilization equipment made of SS material with accessories
5. Heavy duty industrial shredder to shred sterilized red category biomedical waste
6. Effluent treatment plant to treat water from discharge of wet scrubbers and other equipment consisting of sedimentation, dosing tanks and filter press.
7. Diesel generator for emergency backup
8. Oxygen and Nitrogen generators based on swing adsorption technique
9. RF power supply (1KW, single phase along with matching network)
10. Pressure gauges
11. Heaters and heater power supply
12. Mass Flow Controller
13. Water chiller
14. High-Temperature Vacuum Furnace with High-Pressure Gas Quenching
15. Multi-stage roots pumping station
16. Vacuum Chambers of various dimensions
17. Optical Emission Spectrometer
18. Ion Source for Producing ion beam of energy range 50 - 2000 eV
19. UHV system of various dimensions
20. SNOM AFM Scanner,
21. FDTD/SPIP software
22. Portable Raman system
23. Compact e-beam evaporator
24. Turbo Molecular pump of various specifications
25. High Vacuum SS Chamber (Spherical, Diameter: 500 mm with load lock)
26. HIPIMS Power supply (6 KW, 3 phase)
27. Ion energy analyzer
28. Vacuum Chamber and subsystems
29. Power supplies
30. Quantum Efficiency Measurement
31. H<sub>2</sub>S detectors and Upgradation of safety system
32. Diesel generator
33. Flue Gas Analyzer,
34. Power supplies,
35. Experimental system + PS for electric and magnetic fields,
36. Turbo pump
37. AFM scanner
38. Cryogen free PPMS/CFMS with magnetic measurement module Vibrating sample magnetometer (VSM)

39. Experimental plasma pyrolysis chamber
40. RF Components such as amplifier, Directional antenna system, and Broad band Antennas and SDR etc.
41. Controlling systems for vacuum and power supplies such as comsole, leak detector, high voltage power supply etc.
42. Radiation measuring systems such as Wein Filter, Spares gamma and neutron detectors, HV feed through, Insulator etc.
43. System for RF applications on seeds or similar etching system such as Water Contact Angle Measurement Instrument, Optical Emission Spectroscopy up gradation, Florescent Microscope etc.
44. High Voltage Probe & Current Transformers (CTs)
45. High speed RF switch 2GHz to 20 GHz (SPDT)
46. ZERO-BIAS SCHOTTKY DIODE DETECTORS 2GHz to 20GHz
47. RF Power Meter with Diode sensors 2GHz to 20GHz
48. Semiconductor devices(100 Ampere, 1.5kV) IGBT, Diodes, MOSFets, Diodes, SCRs
49. Hot Wire Anemometer, 0-30m/s
50. Vector Network Analyser (1MHz to 20 GHz)
51. Combination Vacuum gauge (1500 mbar-10(-8)mbar)
52. Turbo Molecular Pump (80 liter/sec)
53. Bidirectional couplers 2GHz to 20 GHz
54. Voltage controlled oscillator 2GHz to 20GHz
55. Gas dosing valve (high Precision)
56. Circulators 1 GHz to 2 GHz
57. Spectrum Analyser (10kHz to 20 GHz)
58. CW 13.56 MHz RF source with impedance matching network for making of plasma, impedance range=0.1 to 10 ohm
59. Stub tuner for matching impedance in frequency range of 100-500 MHz with power handling capacity 100 watt
60. RF Power meter for (-20dBm to +50 dBm) with frequency range 10-500 MHz
61. Power Amplifiers for 10-500 MHz for 100 watt output
62. Programmable software defined radio SDR (transceiver) for frequency 50 MHz to 3 GHz
63. Tunable RF filters with High power handling of 100 watt in frequency range 10-500 MHz
64. RF Fixed attenuators, high-power attenuators, digital step / programmable attenuators, voltage variable attenuators from DC to 1 GHz with 20dB attenuation
65. Signal generator (2 GHZ/18 GHZ)
66. Radiation measurement meter (frequency up to 20 GHZ)
67. Optical emission spectrometer in 320-1000 nm wavelength range and focal length >300mm, optical resolution of 0.2nm
68. CW Signal generator ( 9kHz-3GHz) with FM,AM modulation and output power of -120 to 10dBm
69. NF3 gas detector 0-30ppm
70. Mass flow controller (NF3 gas) 0-500 sccm
71. 40 KF FUSED SILICA (QUARTZ) VIEWPORT
72. UHV gate valve with DN 100 CF flange
73. "Wien Filter with a fixed magnetic field (with rare-earth permanent magnet circuit) and a set of electrostatic plates.
74. Fission Chamber/Boron lined proportional counter :1500 mm to 400 mm
75. Neutron and Gamma Area monitor: He3 and GM counter

76. Bending Magnet
77. Linear Induction Motors 0 to 415V, ~1kA (short pulse)
78. 3-phase, 415V, Variable Frequency Drives
79. Alpha detector
80. Workshop machines (CNC VMC, shearing machine with accessories)
81. 12 MW Water Cooling System
82. Wi-Fi Access Points & Controller
83. Containerized Data Center turnkey project with 8 racks
84. High Configuration Server
85. Routers with 10G interface
86. "Multiparty VC End Points,
87. Multi Control Unit (MCU)"
88. 2 Petabyte Storage System solution
89. VDI (Virtual Desktop Infrastructure)
90. Smart Class Room with accessories
91. "Desktop Computers
92. (All-In-One, Desktop Computers)"
93. Multi-Function Printers
94. Network Access Control solution for the campus network
95. High Configuration Server Hardware
96. Data Backup Solution for minimum 500TB storage
97. GPU-CPU cluster (NVlink or equivalent configuration)
98. Position control power supply (Feedback power supply rating 300 V, +/- 3 kA.)
99. Divertor Power Supply (300V, 30 kA)
100. Cryo valves for helium as well as nitrogen services (On-off, control or Hand valve, Electro/pneumatic valve)
101. Impurity detector (Trace Impurity of N<sub>2</sub>, O<sub>2</sub>, Moisture and THC in Helium gas, Range: 0-100 ppm)
102. PLC Upgradation of Cold-Box (Upgradation PLC module of cold-box Eurotherm T2750 PAC modules, IO: 140 nos. , # 02 CPU with designated 16 modules racks, 08 module AI, 09 AO, 01 DI and 12 nos. of DO)
103. Cryo Temperature Sensors (Range: 4.2 K - 325 K) , Model: Cernox or CCS
104. Cryo compatible Resin Epoxy (10 Kg)
105. Stainless Steel Pipes (SS 316 L, Size: ½ in to 4 in (NB), Length: 10 m)
106. S-Glass Roving (9 micron, 360 tex, S-Glass Yarn)
107. Oil consumables for Rotary and Roots vacuum pumps 50 L container x 02 nos., P3 grade Oil)
108. Breox Oil (B35) and Charcoal (Breox B35 Oil for He compressors 200 L x 3 drums, 200 kg Charcoal)
109. ORS, POS and Purifier Filters for periodic maintenance
110. Filter FC 410 & FC 418 for Helium cold box
111. O-rings / Gaskets / seals (10 kF, 16 kF, 25 kF, 40 kF and 50 kF
112. Material: Viton / Nylon / Teflon PFTE)
113. Cryo Compatible Bellows (SS 316 L, Size: ½ in to 4 in (NB), Length: 0.25 -1 m)
114. Multi-layer Insulation (MLI) (Aluminized Mylar, Fibre Glass Net as spacer material, Punched holes, 100 m L and 1 m width Roll)
115. HTS Tape – BISCO or YBCO (Bi-2223 or Di-BSSCO, YBCO, L : 50 m, Critical Current at self-field at 77 K: > 120 A)
116. MgB<sub>2</sub> wires (L : 500 m, Critical Current at self-field at 77 K: > 50 A)

117. Helium gas (Qty: 2000 M3, Purity: 99.999% (4.6 Grade Helium gas))
118. Liquid Nitrogen (Qty: 24 Lacs Liters (Every Year 8 Lacs x 3 Y), Purity: 99.999%)
119. PLC cards AO/AI for Compressors station
120. Consumables for Pneumatics Utility
121. Sub-components for Current leads
122. Helium Leak Detector (3 nos.) (1. Backing pumps capacity from 15 to 35m<sup>3</sup>/h. 2. Pumping Speed capacity from 2 to 10 l/s. 3. Vacuum and sniffing leak detection)
123. UHV Gauge Heads (15 nos.) (Replacement gauge heads with CF fitting compatible with M/s. Granville Phillips (MKS) make 356 Micro-Ion Plus modules -P/N: 356006-YG and 274 UHV Nude Gauge Flange - P/N: 274042.)
124. RGA Ion Source (10 nos.) (Replaceable Open Ion Source with Dual Thoria Filaments for MKS022 Series RGA (MKS make) P/N: 842-043)
125. Ionization Gauge (4 nos.)
126. Turbo molecular pump Hi pace 300 bearings (15 nos.)
127. Turbo molecular pump Hi pace 2300 bearings (15 nos.)
128. Oil consumables for Rotary and Turbo molecular vacuum pumps
129. Annual maintenance contracts
130. AMC of Pfeiffer make Pumps and helium leak detectors
131. Divertor Power Supply for Aditya-U
132. PF-6 Power Supply for SST-1
133. Up-gradation of Plasma Control System H/W and S/W Controller, A/D, D/A, Timer and DIO modules along with software drivers
134. Supply and Installation of Turbo Molecular Pumping System with 150 CF Inlet Flange and Nitrogen Pumping Speed  $\geq 650$  l/s
135. Supply and Installation of Turbo Molecular Pumping System with 250 CF Inlet Flange and Nitrogen pumping Speed  $\geq 1900$  l/s
136. Mass Flow Controller (MFC) with Local Display Unit and mass Flow rate 50, 100, 300 SCCM
137. Residual Gas Analyzer with 200 AMU Including Electronics Unit
138. Supply and Installation of Cryo Pumping System with 300 CF Inlet Flange and Water pumping Speed  $\geq 9000$  l/s
139. 140. DCCT for pulsed and continuous operation; a) +/-2 kA; a) +/-5 kA; a) +/-14 kA; a) +/-20 kA
140. Power supplies and DAQ for magnet system
141. Upgradation of 82.6 GHz, 200 kW Gyrotron
142. 35kV Power supply
143. UV-VIS Spectrometer (200 – 700 nanometer)
144. CCD cameras
145. X- ray ( 0.5 KeV-100 KeV) Imaging systems
146. Fast Optical imaging system in visible spectrum
147. Phase Quadrature (IQ) Analyser (1-42 GHz) + Lab Equipments
148. Heterodyne Interferometer Systems (140 GHz) – 7 nos.
149. Microwave assemblies for 16-channels Radiometer (60 -110 GHz)
150. Millimeter Wave vibration time-series systems (90 GHz) & VCO assemblies (26 – 40 GHz)
151. Closed Loop Detector System for Michelson Interferometer ( 75 – 1000 GHz)
152. Vacuum pumps and components for Time of Flight System of Neutral Particle Analyzer (NPA).
153. Infrared cameras

154. Compact Charge Exchange- Neutral Particle Analyzer (for 100 eV – 1 KeV ion temperature) System
155. Vacuum, RF components, Electrical component, Power Supply
156. Fabrication and testing of TF coils (12.5 kA, 250 ms flat top Multi-stage Capacitor bank based Power Supply with a ramp rate of 1.5 MA/s)
157. New VF Power Supply
158. Equipment related with LN2 sub cooled system
159. Fabrication of one shaped coil
160. Fabrication of a solenoid coil producing magnetic field up to 3T
161. Procurement of vacuum components
162. Procurement of cryogenic components
163. Procurement of diagnostic equipment
164. Procurement of control equipment
165. Equipment for Characterization facility of different structural & functional materials
166. Equipment for integration of EHCL and HHF Test Facility
167. Cryocooler Assembly with standard accessories having cooling capacity in Vertical Orientation: Minimum 20W @  $\leq 16K$  at 50 Hz, in Horizontal Orientation: Minimum 20W @  $\leq 19K$  at 50 Hz
168. Calorimeter
169. Enhance data acquisition system of existing tokamaks -Aditya-U diagnostic data acquisition system: SST-1 central data storage capacity expansion; Server hardware for various DAC services
170. DAC system for ST
171. Motors + Gearbox + controllers + IPC for Hyper-redundant Inspection System
172. Power supplies, oscilloscope, function generator, Isolation transformers, soldering de soldering stations
173. 70 kV, 42 A HVDC power supply for ECRH and LHCD System
174. 35 kV, 105 A HVDC power supply for ICRH System
175. Tunable Diode Laser
176. RF Generators
177. Visible Spectrometer
178. TMP, Gate Valves & Gauges
179. DAC modules
180. Experimental chambers
181. High current power supplies for different magnet systems
182. Magnets
183. High Power microwave Coupler
184. Microwave components
185. Optical and Opto-Mechanical components
186. Energy Storage Capacitor
187. Thermogravimetric Analyzer, Vickers hardness tester, FTIR Spectrometer
188. W-Cu made segmented plasma torches
189. Electrical & Electronics components
190. Instrumentation feedthrough and view ports
191. Optical and Opto-Mechanical components
192. Graphite electrodes Sod. Hydroxide, etc.
193. Consumables for nano powder production; Consumables for sterilization; Consumables (Ag, Au, wafers, sharp tip, gas, Desiccators, Freezer, maintenance of all systems, AFM tips, TEM grids, thermocouples etc.)

194. Consumables like targets, AFM tips, TEM grids, heaters, thermocouples, H<sub>2</sub>S Gas, SS foil, Ar, N<sub>2</sub>, O<sub>2</sub> UHP gases and commercial gases
195. Different gases and materials required for etching and neutronics such as deuterium, silicon wafers and Tritium Target
196. Installation and commissioning of hardware for digitization and integration for electrical distribution system of 132 kV Substation
197. Rooftop Solar Power System, LED lightings & spares and maintenance of Utility Power systems
198. Ferrous and non-ferrous metallic and nonmetallic materials for Workshop
199. Pipes, fittings, valves, tanks, pressurizers, cables, PLCs etc. for Water Cooling Plant
200. VFPS Upgradation
201. OTPS and Wave shaping circuit upgradation and new VFPS
202. Procurement of power supply spares and transformer overhauling
203. Liquid nitrogen and helium gas consumables
204. Cryogenic accessories and spares
205. Manufacturing of current leads
206. Cryo-plant maintenance and spares
207. Manufacturing of 4 Nos. of current leads
208. Upgradation of hot N<sub>2</sub> system
209. Delivery of hardware components
210. Delivery and testing of controller
211. Testing and commissioning of rectifier circuit
212. Components for Solid state crowbar Thyristors etc.
213. Components for Solid state Switch (IGBTs), Power supplies, CTs, probes etc.
214. Liquid Helium
215. HVDCPS, Consumables, Ferrite, Ceramic, Magnet, Copper disc, SS disc, etc.
216. Accessories and parts of Hard x-ray and soft ray systems
217. Thomson Scattering System Installation at Aditya-U
218. Prototyping and fabrication work of components
219. Procurement HTS tapes/2G HTS wire and associated consumable
220. Procurement of structural materials for shaped coils
221. Procurement of cryogenic accessories and consumables
222. Procurement of flexible cryostat
223. Professional services required for experiments performed in EHCL and HHF facility
224. Fabrication, Assembly and Testing of Target Handling System for HHFTF
225. RCC-MR double walled bellow of diameter ~2m
226. Elliptic metallic seals 2 m x 0.7 m for UHV boundary
227. CFC Tiles
228. Prototype THE with improved design
229. Fabrication of faraday cage
230. Vacuum vessel and vacuum pumps for xenon pumping, gate valves, gauges, mass flow controllers, water cooler, vacuum feed-through
231. CNC machining of extractor Grid and fixtures
232. Electrodeposition of OFHC copper
233. UPS power for tokamak systems.
234. Gases (Deuterium, helium, argon etc.)
235. Motors + Gearbox + Encoders + controllers + IPC for Single Arm Manipulator and Dual Arm Manipulator System
236. Gripper for Single Arm Manipulator and Dual Arm Manipulator System

237. Vision (Hand and Head Camera) and lighting system for Single Arm Manipulator and Dual Arm Manipulator System
238. Motors + Gearbox + Encoders + controllers for Winch System
239. Force Torque sensors, temperature sensors, electrical feed-throughs for Single Arm Manipulator and Dual Arm Manipulator System
240. Prototype Single Arm Manipulator and Dual Arm Manipulator System
241. Design, Fabrication, Assembly, Installation and Commissioning of Single Arm Manipulator, Winch System and Dual Arm Manipulator System
242. Design, Fabrication, Supply, Installation, Testing and Commissioning of Anechoic chamber of size 5m x 5m x 4 m (lbh) at 2 GHz to 26.5 GHz with shielding effectiveness of -80dB and cylindrical quiet zone with quietness level of -30 dB in the total frequency region
243. Inverted Metallurgical Microscope
244. Stereo Microscope
245. Impression Creep testing Machine
246. AFT Arrow software (network license)
247. Aluminum Extruded T-slot Profile 60 mm X 60 mm (150 meters) along with compatible accessories (90 deg. Al Die cast Corner bracket, Button Head Hex Screw (M8) SS304, Hammer Head T-bolt (M8) SS304, Flat nut slot-block sliding type (M8) CS, Floor Mounting Brackets Al, End Cap Plastic)
248. Continuous Emission Monitoring System (CEMS) to monitor stack gas.
249. Flue gas scrubbing system consisting wet scrubbers, heat exchanger, cyclone separator, Induced Draft fans.
250. Bottom ash collection system to remove residue from the waste disposal chamber.
251. Gate Valves made of SS / MS with cooling jackets to isolate waste processing chamber.
252. Industrial Chimney to exhaust flue gas as per standards stipulated by pollution control board.
253. Conveyor system to handle and feed bulk waste packets in semi continuous mode with full automation and control.
254. Process Calibrator with multifunction to calibrate temperature and pressure transmitters at field.
255. Temperature sensors and transmitters such as thermocouples, RTD
256. Pressure Sensors and Transmitters such as manometers
257. Bulk density Graphite electrodes for plasma arc generation
258. Input Power Cables Three & Half Core for Power Supply
259. Output Cables Single Core for DC Power Supply
260. Turbo Molecular Pump
261. Customized chamber for cylindrical sputtering system with heater, power supplies and other accessories.
262. TF PS for SSST
263. PS for Ohmic Coil of SSST
264. PF-1 PS for SSST
265. PF-2 PS for SSST
266. PF-3 PS for SSST
267. Flow Meter & Flow Switch for Water
268. PLC and LabVIEW SCADA system
269. PXIe based DAQ digitizer cards
270. Servicing & Calibration of PXIe based DAQ modules through OEM/ Supplier
271. Probe Drive Systems

272. Fast Camera Diagnostic system
273. CO2 LASER, optical fibers, high quality lens system, optical benches, refractive materials, ZnSe vacuum windows
274. Microwave source of 22 GHz Diode Oscillator, flexible and fixed wave guides, bends, detectors
275. Electron Gun and power supplies for electron gun system
276. Miscellaneous Items(IC's, Band Pass Filters, Amplifiers, Tungsten, Molybdenum, Ceramic tubes, Bush, Paint & Adhesive, Attenuator Probes, Computer Consumables, Vacuum Connectors, feed-through, Measurement Units, Flow Switches, Temperature sensors, Pump Oil, Clean & Overhauling kits for pumping system, Optical Fibres, Fibre Optic vacuum interface, Pneumatic valves, Gate valves, Coaxial/ Tri-axial Cables & Connectors, Varactor diodes, Surface mountable electronics components, precision high vacuum compatible leak valves, hydraulic clamps).
277. Oxygen Free Electronic (OFE) Copper Plates
278. Rigidax Tolling compound (Special wax)
279. Liquid Crystal Films (LCF) for temperature measurement (application in continuity check of ion extractor grid cooling channels)
280. Vacuum Oven 200oC at 10-4 mbar [size: 600 mm (L) × 600 mm (W) × 500 mm (H)] with several diagnostic ports and temperature recorder.
281. Vacuum chamber [size: 600 mm (L) × 600 mm (W) × 500 mm (H)] @ 10-5 mbar] with several diagnostic ports
282. Turbo Molecular Pump (TMP)
283. Route Pump
284. Pirani, Penning gauges
285. Pressure gauges (17 bar Nitrogen and 16 bar Helium)
286. Precision CNC machining of OFE copper for fabrication of ion extractor grids
287. Electro-deposition of OFE copper of 3 mm thickness for fabrication of ion extractor grids
288. Machine for wax filling in ion extractor grid's water cooling channels and manifolds grooves
289. Machine for wax scrapping from the surface of OFE copper base plate of ion extractor grids
290. Storage box for safely keeping ion extractor grids
291. Instrument of ultrasonic measurement of OFE copper layer thickness.
292. High Power laser optics, Mirror, lens wave plates etc.
293. Opto Mechanical components like mirror mounts, translation stages etc.
294. Laser Power meter
295. Precision actuators
296. Vacuum gauges
297. Pulsed White light sources
298. Accessories to for the Nd:YAG laser system
299. Pulsed Nd:YAG lasers
300. Fiber coupled diode laser
301. Programmable power supplies
302. High speed high sampling digitizers
303. Band pass and notch Filters
304. Digital storage oscilloscopes
305. Electronics components
306. Optical fibers
307. Fabrication of laser transport line



308. Developing the dust free lab and associated components
309. FPGA based DAQ system
310. Digital force gauge
311. Fabrication and supply of TF coils
312. Fabrication and supply of Central solenoid coil
313. Fabrication and supply of TR and PF coils
314. Vacuum contactors
315. Pulse CT
316. Resistive load
317. Voltmeter
318. Optical sensors
319. Impulse tester
320. Hi-pot tester
321. Linear Induction Motor (LIM)
322. Linear guides with bearing
323. Carriage
324. Softcatch
325. Structural components (e.g. Steel plate, aluminum channel, brackets)
326. Container for Control Room
327. Pulsed Alternator system
328. Optical Tachometer
329. Jaw coupling
330. Residual Gas Analyzer
331. Palladium Membrane based Hydrogen Purifier O/P flow rate: 12slpm nominal
332. Mass flow Controller
333. Double stage rotary Vane pump
334. Capacitance menometer
335. Ionisation Gauge and controller
336. Convection gauge
337. UHV compatible view port
338. UHV compatible electro pneumatic and manual gate valve of different size
339. UHV compatible electrical feed through
340. Helium leak detector
341. Temperature scanner
342. Fabrication, Assembly, Testing & Supply of Prototype Central Stack (PCS)
343. Procurement of Water Cooling System, Sensors, I&C, electrical cables for PCS
344. Fabrication of support structure for SSST, and Assembly, Integration and Commissioning of SSST machine
345. Shielded enclosure + Radiation protection + Associated test equipment
346. S-Magnetron
347. VNA + Spectrum Analyzer + Power meter
348. DC Field Probes
349. E-dot, B-dot probes
350. Diode Detectors
351. Terminators
352. Attenuators
353. Adaptors
354. Differential Probes
355. Waveguide coupling

356. Signal Generator (up to ~ 18 GHz)
357. Coaxial High Power RF Stub Tuner
358. Coaxial Phase Shifter High Power RF
359. High Power RF Coaxial Line and Its Components
360. Coaxial High Power RF Switch
361. Antenna system
362. CRO
363. EHV Grade Oil
364. AMC for Fire Fighting
365. Fire Fighting upgrade
366. Copper Earthing Pits
367. O&M of 132kV SS and associated 11&22kV, 415V distribution system
368. Spares for 132KV & 11kV, OC/EF relay, Fire Fighting
369. 11kV / 415 V Distribution Transformer, 2 MVA
370. 415 V LT Panel
371. 11KV VCB Panel
372. 11KV Power Cables of various sizes
373. 132KV Lightning Arrester
374. High speed diesel fuel
375. LT power cables of various sizes & PTFE cable
376. AMC of both 1700KVA DG sets
377. Consumable spares for DG sets
378. Distribution Transformer spares
379. DG BATTERIES
380. ACB SPARES
381. Up-gradation of controllers in 1700KVA DG sets
382. Up-gradation of LT Panels
383. Licensing and conditioning of underground tank for Diesel Generators
384. VF Power Supply for ADITYA-U
385. Electrical Tools and tackles
386. Transformer overhauling
387. DCCT
388. Spares for existing power Supply
389. Control spares for power supplies
390. Manufacturing and supply of VW converter parts
391. CTC conductor
392. Air core reactor
393. Crystal : 100 MHz
394. VCO-1 : 5-10GHz
395. VCO-2 : 13-20GHz
396. Freq Doubler-1 : 6-10GHz (input)
397. Freq Doubler-2 : 13-20GHz (input)
398. Amplifier : 6-20GHz
399. Balanced Mixer : 26-40 GHz
400. Freq. Sources (up to 40 GHz)
401. Signal source (analog)
402. Dry Cryogenic Detection System
403. Exposed Linear Encoder with Grating Scale
404. Wire Grid Polarizers in THz range

405. Silicon carbide based black body hot calibration source
406. Fixed Frequency Gunn Oscillators (E,W- band)
407. Balanced SSB Mixers (E,W- band)
408. Band Pass & Notch Filters (E,W- band)
409. Isolators (E,W- band)
410. Low Noise Amplifiers (1-20 GHz)
411. Noise Source (E,W- band)
412. Passive Waveguide components like directional couplers, Twists, etc.
413. Multi – channel IF Receiver (1 -20 GHz)
414. PLL source - 100 GHz
415. PLL source - 101 GHz
416. Biased balance mixer (100GHz, w-band)
417. Horn antenna (w-band)
418. Directional coupler (w-band)
419. DRO 7 GHz
420. DRO 16 GHz
421. DRO 17 GHz
422. Frequency Multiplier for w-band
423. IQ demodulator (MHz range)
424. Filters and amplifiers (MHz)
425. Waveguides parts in W,F, and D-band
426. Waveguide Filters ( W, F, D- Band)
427. Lab furniture
428. Passive Waveguide Components: Directional Couplers, Bends, Twists etc.
429. Source: Gunn Oscillators, VCO's, PLDRO's etc.
430. Amplifiers: Power and Low Noise
431. Balanced / IQ Mixers
432. Band Pass and Notch Filters
433. Noise Sources
434. Directive Antenna
435. Schotkky Detectors
436. Cryogenic Detectors
437. Exposed Linear Encoder with Grating Scale
438. Wire Grid Polarizers in THz range
439. Fused Silica View port
440. Line Laser
441. Tripod, Motors & its accessories for Antenna Movement
442. Up-gradation of existing R & S VNA (ZVA-50) for Time gating facility
443. Material Measurement set-up
444. Cables & Connectors ( 0 - 40 GHz)
445. Power Supply (30 V, 5A)
446. Supply and Testing of 200kW Solid State Rectifier with Crowbar Switch Panel
447. Power supplies
448. Integrated circuits
449. Passive components
450. Racks & Chassis
451. Test and measurement Instruments
452. Programmable logic devices
453. Soldering station

454. PLC systems for automation
455. Transformers
456. Evaluation boards
457. Laptops
458. Wavelength Meter with Accessories
459. Acoustic Optical Modulator & Driver unit
460. Piezo Mirror Shifter and modulators
461. Accessories to for the Excimer laser system
462. Accessories to for the diode laser system
463. Spectrum Analyzer (DC to 100 MHz)
464. Photo-multiplier Tube Detectors and accessories
465. Control panel of AMPS
466. Flow analysis and modeling software for compressible fluid (gaseous) systems
467. Edge welded bellows
468. SS 316 VCR fittings
469. Data logger
470. Rare earth Magnets(NdFeB/SmCo)
471. Pipe feed through fittings
472. Flush face melt pressure sensor for liquid metals
473. Differential pressure transmitter of gaseous medium
474. Variable Frequency Drive for electric motor
475. High temperature bellow sealed valve Make Swagelok
476. Pb-Li ingots
477. Pb-Li to Air heat exchanger
478. NI make Data Acquisition module
479. VEGA make Radar Level Transmitter
480. Emerson Make Radar Level Sensor
481. Vortex Flow Meter
482. Pb-Li to Pb-Li recuperator
483. Therminol-55 (Heat Transfer Fluid)
484. High temperature compatible strain gages
485. Digital mass flow meter
486. Input Modules for Eurotherm T2550 Programmable Automation Controller
487. VFD Control panel for Canned Motor Liquid Metal Pump
488. Supply and Installation of Cable trays for EHCL Lab
489. Various Type of Electrical Heaters
490. UPS
491. Power Cables for VFD applications
492. Aluminium alloy plate
493. Floor crane
494. ON/OFF pneumatic valves
495. Solenoid valves
496. Electric motor for liquid metal pump
497. Fabrication of MHD test mock ups
498. Cover gas pressure transmitter
499. Circulation type heater for Pb-Li
500. Temp control panel
501. Mass flow indicator and controller
502. SS flexible hose with 16 & 25 KF flange

503. SS 316 Ferrule fittings for 1/8, 1/4 & 3/8 inches sizes (Connectors, Reducers, and Unions etc.).
504. SS 316 Tubing 1/4, 3/8 inches
505. SS 316 Tubing 1/4, 3/8 inches SS 316/304 Ball and needle valves
506. Digital gauges/transmitters
507. Cylinder trolleys
508. Recirculating chiller
509. Pressure transmitter
510. UHV DN 160 CF Manual Gate Valve
511. Vacuum chamber, heating system and other accessories of the system for reactive sputter coating inside a pipe
512. Fabrication and supply of Magnet Coils for Hydrogen Isotope Permeation Barrier Coating System
513. Lithium & titanium-based chemicals
514. Chemicals for lithium titanate preparation
515. Spares & Consumables for simultaneous thermal analyzer, model Linseis STA PT 1600
516. Spares & Consumables for Laser flash apparatus. Model Linseis LFA 1000
517. Spares & Consumables for high-temperature dilatometer, model Netzsch Expedit Select
518. Spares & Consumables for mercury porosimeter, model Quantachrome PM 60
519. Spares & Consumables for planetary ball mill, model Fritzsche P5
520. Spares & Consumables for particle size analyzer, model Brookhaven nanobrook omni
521. Spares & Consumables for extruder and spheronizer model Umang UICE lab
522. Spares & Consumables for Helium pycnometer model Instruquest
523. Spares & Consumables for pellet press model techno search instruments
524. Spares & Consumables for laboratory freeze dryer model model SP scientific BTP9EG
525. Spares & Consumables laboratory sieve shaker model electrolab
526. Rotary pump and its subsystems
527. X-Ray fluorescence spectrometer
528. Spares & Consumables for nabertherm muffle furnaces
529. Spares & Consumables for laboratory vacuum oven
530. Spares & Consumables laboratory deep freezer model REMI
531. Spares & Consumables for keysight datalogger
532. Gas flow distribution line
533. Thyristor & PID controlled power supply for compatibility experiments
534. Pressure and vacuum gauges, Vacuum valves and its accessories
535. Laboratory Rheometer
536. Peristaltic pump and its accessories
537. Alumina crucibles
538. DC power supplies
539. Platinum wires of different diameter
540. Load cell with indicator
541. True RMS Clamp meters
542. A universal type datalogger
543. Inconel material machined parts
544. A mass flow controller
545. A differential pressure transducers
546. Thermal sensors
547. Displacement sensors
548. Twin Jet Polishing Machine

549. Low speed Cutting Machine
550. Filler wire P91, RAFMS, 316L, 309L, Ni alloy
551. 316LN plates
552. Spares and Consumables for Metallography Instruments
553. Spares and Consumables for Mechanical Testing Instruments
554. Mass Flow controllers
555. Mass flow meters
556. Thermocouples
557. Heat flux sensor
558. Data loggers
559. Heaters and heating elements
560. Test channels and mockups
561. Insulations
562. Piping connectors and accessories
563. Power supply
564. Belt Grinder
565. Spares for Optical and Stereo Microscopes
566. SS316L Seamless pipes (and fittings) of different size e.g. DN 100, DN50, DN25, DN 40 etc.
567. Structural steels of different types e.g. ISMC channels, sheets, plates and bolts/fasteners, etc.
568. Insulation material of different thickness
569. Temperature and pressure transmitter and DPT for helium and water application
570. Flow meter for water application (Rotameter for chiller)
571. Flexible pipes (hose/bellows)
572. Manual ball valves for isolation/vacuum purpose (spare)
573. Replacement Batteries for UPS
574. Multicore instrumentation cables
575. Communication cables
576. High voltage DC power supply
577. Helium leak detector with helium pumping speed greater than equal to 2.5 l/s on buy-back basis.
578. Helium leak detector with helium pumping speed greater than equal to 10 l/s on buy-back basis.
579. Indenting concertina coil and Chain Link fencing for the work of increase in height of Compound wall at IPR campus
580. Supply, routing and installation of busbar
581. Supply of 300kV DC Earthing System
582. Electroformed Mesh
583. RF Detectors
584. Magnetron Sputtering Gun
585. Full range vacuum gauge
586. Water Cooler
587. IR Camera
588. Manipulator
589. Dehumidifier
590. CZT based X-ray spectrometer for the measurements of X-ray in 30 keV - 300 keV
591. Multipocket electron beam evaporator
592. 400k Ohm, 250 watt Non inductive Wire wound resistor

593. 100k Ohm, 100 watt Non inductive Wire wound resistor
594. ONLINE 5 KVA UPS with SNMP CARD
595. Rotary encoders (Absolute)
596. Rotary encoders (Incremental)
597. ISO 200 F UHV gate valve
598. Chiller Unit for Turbo Molecular Pump (TMP)
599. Transient field calibration set-up
600. Isolation transformers
601. Permanent Magnets
602. In-line IV probe
603. MS Sections (Angle, C-channel, I-Beam, Flat, SHS, RHS, etc.) of various sizes
604. Dehumidifier
605. Handheld digital multimeter
606. MF controllers (0 - 100 sccm)
607. Roots / Scroll Oil free Dry Vacuum Pump with exhaust silencer
608. Manually operated Fine / Precision Gas dosing valve / Manual leak valve
609. Manually Operated Vacuum Ball valve
610. HV Sine Wave Generating HF Power Supply
611. 20 kHz Variable High Voltage Power supply
612. Small Table top Tesla Transformer
613. Compact Table top Tesla Transformer
614. High Voltage rectifier Diodes
615. 3-Axis Stabilized Handheld Gimbal
616. Superconductor-Yttrium barium copper oxide (YBCO) disk (Diameter=50mm, Thickness=10mm)
617. Superconductor-Yttrium barium copper oxide (YBCO) disk (Diameter=28mm, Thickness=10mm)
618. High frequency transformer core
619. Air compressor
620. Femtosecond Laser system
621. Dry scroll vacuum pump
622. Vacuum Test Facility (1. Internal diameter of vessel - 1.5 m and Overall length - 3.5 m; 2. Xenon pumping speed : 30,000 l/s; 3. Vacuum gauge: 1000 mbar to 1e-7 mbar)
623. MS sheets of various sizes
624. Hylam Sheet and round bar of various sizes
625. Perspex (Acrylic) sheet and round bar of various sizes
626. CAD-CAM software (Mastercam, Solidworks, etc.)
627. High Vacuum Chamber With Support Stand For Large Area Plasma Source
628. Ceramic 5kV Electrical Isolator (Maximum Pressure: 17bar; Temperature range: -269 °C to 350 °C, Voltage isolation: 5kV; Compatibility with vacuum during operation:  $\leq 10^{-6}$  mbar outside; Helium leak tightness:  $10^{-9}$  mbar-l/s or better (at ambient conditions); Size - O.D.  $32.00 \pm 0.25$ mm, I.D.  $29.00 \pm 0.25$ mm; Qty - 10Nos.
629. Supply of 300kV DC Connector (Plug) and Receptacle (Socket) assembly.
630. Self-contained Breathing Apparatus (SCBA) as per the IS 10245 Part-2.
631. Vacuum chamber with accessories for nanopowder synthesis.
632. Safety relief valves for Liquid Nitrogen service.
633. Flow diverter ball valves for Liquid Nitrogen service.
634. Vacuum View ports
635. Vacuum feed through

636. Consumables: Copper tape, Aluminum tape
637. Full range vacuum gauge
638. Swagelok tube fittings: Ferules nuts, VCR fittings, tube fitting connectors for high pressure application
639. Gas flow valves
640. Needle valves
641. Angle valves
642. PLC based control systems with associated input/output modules and control box.
643. Fabrication related to vacuum and cryo systems, flanges and associated components
644. Laser diode and accessories
645. Photo diode and accessories
646. Rotary vane pump
647. Digital storage oscilloscope with 4 channels and 100 MHz bandwidth
648. CMOS camera with 300 fps for Schlieren Imaging and acoustic field analysis related to nanopowder collection mechanism
649. Ultrasonic Cleaner
650. WR340 rectangular waveguides
651. 19 inch/ 42U Enclosures Networking/ Server rack
652. Digital Storage Oscilloscope-Qty:01
653. Two channel function generator-Qty:01
654. RF simulation software for active and passive devices
655. VIS Spectrometer
656. Magnet DC Supplies
657. Chiller-1TR-3no.s
658. Chiller-3TR-1no.s
659. Experimental Chambers
660. Vacuum Vessel (High Density Helicon System)and consumables[present]
661. UHV Gate valves 200 ISO [present]
662. Xe Gas High purity (300 Ltrs)
663. Kr Gases (500ltrs)
664. Materials (Copper, Steel, Aluminum) for lab purpose
665. Magnets [present]
666. Electronics & Electrical Items
667. Function Generator
668. Signal Generator
669. Oscilloscope (500MHz DSO)
670. Oscilloscope (200MHz-analog DSO)
671. Electronics Multimeter (4 nos)
672. Electrical Panel Distribution System
673. 100A Cables 500 mtrs
674. 1kvA Isolation Transformers
675. Diagnostics Cables and Electronics circuits and Amp etc. related items
676. Instrumentation feedthrough [present]
677. (Vac & High Current & High Voltage)
678. Ceramics Consumables
679. Quartz Plasma source tubes
680. Permanent Magnets Rare Earth (NdFeB)
681. Laboratory Storage Items Almirahs
682. Lab Tool Trolleys and others



683. UHV compatible re-entrant viewport
684. Laboratory bench with electrical sockets
685. Toolkit filing cabinet
686. Supply of 11 kV harmonic filter inductor
687. Digital Vernier Caliper for measurement purpose
688. Procurement of process pump with VFD for secondary cooling system of HHFTF
689. Electronic Water Conditioner
690. Procurement of tube fittings of various sizes and sizes: 100 Nos (approx.)
691. Pipes of various sizes: 2 inch, 1 inch, 1/2 inch of sch-80: 30 meter (approx.)
692. Fabrication, Assembly and Testing of target handling system for HHFTF
693. Fabrication of extension chamber
694. Railing system / trolley arrangement & modifications in existing target handling system
695. Repairing of Magnetron sputtering system and its component such as MFC
696. Magnetron sputtering heater parts
697. Tungsten alloy Rod
698. Upgradation of SCADA of Vac Brazing Furnace
699. Power conditioning equipment for HTTD laboratory in new lab building (Stabilizers, Isolation Transformers, Harmonic filter)
700. Hire external agency to do Market Survey to identify probable customers from plasma spray coating industries and their requirements of tungsten electrodes including Technical Specifications & Quantity of Electrodes.
701. Repairing of Laser Flash System
702. Modification of hardware interlock system of DACS-HHFTF
703. Machining of parts of helium cooled divertor.
704. Graphite block
705. Cable, Connectors, Junction Boxes (to interface EHCL target handling system with DACS-HHFTF)
706. Vacuum Feedthroughs (Electrical, BNC and Thermocouple) for Helium cooled target handling system
707. PXI ROFINET interface module for DACS or OPC Server license (to establish interface between EHCL with DACS-HHFTF)
708. AMC for Gleeble 3800 system.
709. K type Thermocouples (50 Nos.)
710. MS Plates of different sizes
711. MS Square Channels of different sizes
712. SS 316L Pipes of different sizes
713. Ball valves for vacuum line
714. Vacuum pump (rotary)
715. Fabrication of Lithium Injector
716. Fabrication of Sn-Li based liquid metal loop
717. PID based temperature control panel for Sn-Li based liquid metal loop
718. Fiber glass flexible heaters, spiral heaters, and different types of heaters elements
719. Earthing for HHFTF (Earth electrode, earth strip, etc)
720. Procurement of HV gate valve
721. 1/2" bellow seal valve
722. Procurement of Water chiller for Brazing Furnace
723. KF 25, KF 40 and KF 50 Right angle valves for Vacuum application
724. KF 25, KF 40 and KF 50 Stainless steel flexible bellows (hoses) for Vacuum application
725. Up-gradation of 82.6GHz Gyrotron for ECRH system in SST-1

- 726. Liquid Helium
- 727. Electronic components Solid state crowbar (Thyristors, Capacitor, Resistors, etc.)
- 728. Electronic components Solid state Switch (IGBTs, Capacitor, Resistors, etc.)
- 729. 30kV-100mA Power supply
- 730. Data Acquisition and control (DAC) system a) PXI based DAC system b) Electronic cards for the DAC system
- 731. Power supplies for Gyrotrons (Filament, Ion-pump, Magnet etc...)
- 732. Electric equipment's like CTs, HV Probes, HV cables, etc.
- 733. Electronics and fiber optic components
- 734. Mechanical components (vacuum, cooling including LN2 cooling, etc.)
- 735. Microwave components like detectors and low power components

**Updated on 06/12/2021**

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### **Magnetized Plasma Development Section**

- 736. Energy Storage paper and oil filled capacitor 15- 30 kV, Capacitance 50 – 100 microfarad
- 737. Triggered Spark Gap
- 738. Ignitron switch
- 739. High voltage resistor
- 740. Capacitor charging supply
- 741. 1 kW 13.56 MHz RF generator and matching network
- 742. Voltage controlled Microwave source 1- 20 GHz
- 743. High frequency ferrite
- 744. Directional coupler 0.5- 20 GHz
- 745. Optical view port
- 746. Vacuum gauges
- 747. High current DC power supplies for magnet coils
- 748. Fabrication of electromagnets
- 749. Fabrication of Vacuum system
- 750. TMP and dry Vacuum pump
- 751. Kilo Ampere range Pulse Current transformer

### **Microwave Section**

- 752. Chairs (Furniture)
- 753. Computer Tables (Furniture)
- 754. Almirah (Furniture)
- 755. Marble top work bench (Furniture)
- 756. EMD safe work bench (Furniture)
- 757. Open racks (Furniture)
- 758. Stabilizers

### **High Temperature Technologies Division (HTTD): Project Code: RIP4005-S4**

- 759. ~~Variable Frequency Drive (VFD) for Liquid metal loop control panel~~
- 760. Hydraulic Oil (VG32 grade)
- 761. Brazing Filler for Helium Mock-up
- 762. Thermocouple Welder
- 763. Pressure Relief valve for Helium Gas
- 764. Pressure Regulator for Helium Gas
- 765. SS Inline Vertical Multistage Centrifugal Pump with Variable Frequency Drive

**Ultra High Voltage Systems Division(UHVSD): Budget Code: RIP4005-S7-04**

766. Supply of 300kV DC Isolator.

**Others**

767. 2TB SSD drive

**Updated on 28/01/2022**

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**Fusion Blanket Division**

768. Dew point transmitter

769. Moisture/ Dew point Analyzer

**Vacuum Engineering Services Division (Budget Code: RIP4007-S2-06)**

770. High voltage power supply compact module Qty: 2 nos.

771. Digital pressure transmitter Qty: 4 nos.

**Updated on 11/02/2022**

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**PSED-Division Head RIP 4006 S2 01**

772. Supply, installation, testing and commissioning of Direct Expansion type AHU (DX-AHU) air conditioning system and its accessories (air handling unit, condenser unit, electrical control panel, copper multi strand armoured electrical cables, copper flexible control cables, copper wire set for earthing, rectangular ducts, fire damper, electric duct heater, thermal insulation, RCC/PCC platform foundation, minor civil works, etc.) for SRP & ISS lab clean room at FCIPT (IPR).

**Plasma Diagnostics Division Project code: RIP 4007 S4.**

773. Work bench with storage cabinets.

774. Printer.

775. Big screen monitor to display diagnostics data.

776. Lab stools

777. Chairs

**Updated on 18/02/2022**

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**Cryopump and injector Division (Project code: RIP 4005 - S2)**

778. Fabrication, Testing, supply and Installation of Cryo-pumping Test Chamber (CTC)

779. Helium compressor

780. Silicon diode temperature sensors

781. Pulse tube refrigerator

782. Stirling refrigerator

783. Charcoal and High emissivity coating

**Plasma diagnostics division (Project code: RIP 4007-S4-05)**

784. VRI AB CAM VEO HANDLE-01AT0

785. VRI AM CAM VEO CINE KIT 01BV0

**UHVS Division (Project code: RIP4005-S7-04)**

786. Supply, Testing and Calibration of 750kV DC Resistive Voltage Divider

**Updated on 25/02/2022**

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**NBI PS DAC Division (Project code: RIP4005-S7-04)**

- 787. Up-gradation of the PcVue SCADA system
- 788. Purchase of the spares for Siemens PLC components
- 789. Purchase of the spares for Cryogenics Instrumentation
- 790. PCB manufacturing for PXI upgrade
- 791. Electronic consumable for PXI upgrade
- 792. OFC for PXI upgrade
- 793. 5kVA UPS for Cryoplant PLC

Updated on 04/03/2022

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**BETA (Project code: RIP4004-S1)**

- 794. (3500-4200)A / (7- 10)V power supply
- 795. (0.8-1.0)kA electric-vacuum feedthrough

Updated on 11/03/2022

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**Ultra High Voltage Systems Division(UHVSD) (Project Code: RIP4005-S7-04)**

- 796. Supply of 120kV High Voltage Fast Recovery Diodes.

**Spectroscopy Diagnostics Section (RIP4007-S4-06)**

- 797. Cylindrical lens based optical coupler for PMT array and fiber
- 798. X-ray CCD detector

**Fusion Blanket Division (RIP4005-S3)**

- 799. Thermal Imaging Camera
- 800. Insulation Resistance Tester
- 801. Proximity Sensor and RPM meter

**LCPC (Large cryogenic plant and cryosystem) (Budget code: RIP4005-S6-06)**

- 802. Vacuum Feedthrough for sensor wires: 4 Nos
- 803. MLI, 10 reflecting sheets as one layer, 1.5 m X 50 m in one roll: 1 roll
- 804. Stycast with thinner and hardener for cryogenic and helium gas application: 1 ltr
- 805. Computer monitor of ~32 inch size, 3 Nos and TV screen ~50 inch size- 1 no.: 4 Nos
- 806. UPS 6 KVA: 2 nos
- 807. Multimeter: 1 No.
- 808. CRO (cathode ray oscilloscope), multichannel, battery operated: 1 no.
- 809. Pressure transmitter, piezo-electric type, small volume,without local display: 20 Nos
- 810. Pressure regulators, mechanical type, 200 - 14 bar, with helium flow rate ~1g/s: 3 Nos
- 811. Spares of 3 cryogenic long stem valves: 3 sets
- 812. Software for gas chromatograph (impurity analyzer) operation: 1 set
- 813. Helium gas with 99.999% or better purity: 600 Nm<sup>3</sup>
- 814. S304 and SS304L pipes of different sizes for small experimental and system modification work: 1 lot
- 815. Pipe fittings (elbow, reducer, Tee, etc): 1 lot
- 816. Vacuum pump spares for 3 TMPs, 1 root-rotary pump and 3 rotary vacuum pumps: 1 lot
- 817. Vacuum gauges pirani type: 5 nos
- 818. Vacuum line fittings: 1 lot
- 819. Portable welding machine: 1 No.
- 820. Rotary vacuum pump, ~200 m<sup>3</sup> per hr: 1 No.

- 821. Leak tight SS valves for helium services in 6 mm tubes: 20 Nos
- 822. Water cooler of cooling power about 2 kW. 1 No.
- 823. MFW (minor fabrication work) for cold box dismantling and shifting to new lab building: 1 system
- 824. MFW for helium compressor system dismantling and shifting to new lab building: 1 system
- 825. MFW for purifier experiment set-up: 1 system.
- 826. MFW for heat exchanger experiment set-up: 1 ststem
- 827. MFW for different lab welding works: 1 system
- 828. MFW for fabrication of temperature monitor: 1 system
- 829. MFW for fabrication of liquid helium level monitor: 1 system

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**Updated on 08/04/2022**

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**R&D for Fusion Blanket Systems (RIP4005-S3)**

- 830. Industrial Vacuum Cleaner
- 831. Wet and Dry Duty Cleaning

**Plasma Experiments in SST-1: SST-1 Operation & Control (RIP4007-S2-06)**

- 832. Ethernet LAN Components
- 833. Ethernet based Public Address System, VoIP

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**Updated on 21/04/2022**

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**High Power ICRH Systems Division (RIP4007-S3-01)**

- 834. Switch-Mode Power Supply (SMPS) 48V

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**Updated on 05/05/2022**

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**High Temperature Technologies Division (RIP4005-S4)**

- 835. Electro pneumatic 250 CF high vacuum Gate valve.
- 836. 90 degree rotary knob vacuum valve.
- 837. Compound cold cathode gauge head with the controller.
- 838. Cryo temperature monitor unit.

**Fusion Blanket Systems Division (RIP4005-S3)**

- 839. Fabrication of hydrogen sensor and laser welding of iron sheet with SS316 chamber;
- 840. Different size of Iron Foil (Square shape and Disk shape), 99.5% Purity.
- 841. Mass flow controller
- 842. Gas Pressure Regulators

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**Updated on 27/05/2022**

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**CPID Campus Development and Projects Division (Project code is RIP4001-S5)**

- 843. CADMATE CAD software

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**Updated on 10/06/2022**

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**Fusion Blanket Division (Project code is RIP4005-S3)**

- 844. MONOBLOCK WATER PUMP: 02 No.

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**Updated on 17/06/2022**

**RPY-SERB (Project code: 093-87)**

- 845. Antennae
- 846. Amplifiers
- 847. Low noise Amplifier
- 848. Software defined radio
- 849. Vector Network Analyzer
- 850. Computational Board
- 851. Drone/UAV

**Updated on 25/06/2022**

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**Ultra High Voltage Systems Division (UHVSD) (Budget Code: RIP4005-S6-07)**

- 852. Supply of High Voltage Capacitors.

**Project: Pulsed Alternator (Project Code: RIP4005-S7-03)**

- 853. NdFeB grade N52 Permanent Magnets with remanent magnetic field (Br) more than or equal to 1.42 Tesla.
- 854. Fabrication and Supply of Pulsed Alternator system.

**Updated on 08/07/2022**

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**Ultra High Voltage Systems Division (UHVSD) (Budget Code: RIP4005-S6-07)**

- 855. Wide-band width AC Current Probe
- 856. Acoustic Imager

**Updated on 15/07/2022**

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**RYP-SERB (Budget Code: 093-87)**

- 857. RF Circulator
- 858. Antenna Positioning System

**Updated on 22/07/2022**

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**EML (Budget Code: RIP4006-S5)**

- 859. Voltage sensors
- 860. Voltage transducers
- 861. Current sensors
- 862. Current transducers

**Updated on 29/07/2022**

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**Fusion Blanket Division (Budget Code: RIP4005-S3)**

- 863. CuO powder (to be used for oxidation of hydrogen)
- 864. Dew Point Meter (to be used for moisture measurement)
- 865. LaNi5 alloy (to be used for hydrogen storage)

**Updated on 26/08/2022**

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**Ultra High Voltage Systems Division (UHVSD) (Budget Code: RIP4005-S6-07)**

- 866. Supply of High Voltage Capacitors
- 867. Supply of High Voltage Rectifiers/Diodes
- 868. Supply of High Voltage Test Transformer
- 869. Supply of High Voltage Resistive Divider/Measuring Resistors
- 870. Fabrication and Construction of Partial Discharge (PD) Room/ Faraday Cage

**Updated on 16/09/2022**

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**Diagnostics Division, Spectroscopy Diagnostics Section (Budget Code: RIP4007-S4-06)**

871. Integrating sphere for calibration of spectroscopic system

872. Optical detector assembly based on fiber, PMT array and associated electronics.

**Updated on 07/10/2022**

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**FPED/LVPDS Division, (Budget Code: RIP 4004 S3)**

873. Ladder (Stainless Steel)

**Pulsed Alternator (Budget Code: RIP4005-S7-03)**

874. Revolving Chair with Arm Centre pivot mechanism

**Updated on 16/11/2022**

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**Fusion Blanket Division, (Budget Code: RIP 4005 S3)**

875. Microsoft Visio Professional Software to draw the PFD and P&ID of the various experimental loops

**Updated on 02/12/2022**

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**High Temperature Technologies Division (HTTD) (Budget Code: RIP 4005-S4)**

876. Power Deflection Amplifier with water fittings, Model: CA5020-20A (Part of 200 kW High Power Electron Beam System)

**Updated on 23/12/2022**

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**Aditya Upgrade Operations Division; Project code: RIP4007-S1-02**

877. IR Photo detector and Compatible Pre-amplifier

**Updated on 06/01/2023**

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**UHVS Division; Project code: RIP4005-S6-07**

878. IGBT Module, Gate Driver card and Gate Driver Power Supply

879. 30kV, 5A DC HVPS

**Updated on 13/01/2023**

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**Vacuum Engineering Services Division; Project code: RIP4007-S2-06**

880. Silicon Bulk Fibreglass Thermal Insulation Sleeve; Qty: 350 mtrs.

**Updated on 17/02/2023**

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**Plasma Experiment in SST-1 (SST1-Cryogenics) Division; Project code: RIP4007-S2-01**

881. Centralized LN2, GN2 distribution system for New Lab at IPR

**Updated on 21/02/2023**

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**High Temperature Technologies Division (HTTD): Project Code: RIP4005-S4**

882. Three phase Auto Transformer for Liquid metal loop control panel

**Updated on 24/02/2023**

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**Technology Development for High Power Beams: Project Code: RIP4005-55**

883. Jigs for large size( 2m dia) Ion source grid assembly

884. Ceramic coated Copper coils for RF based Negative Ion source

885. PU Insulated Copper Coils for RF based Negative Ion source

886. Pressure Reducing Valve - 65 NB for By pass line of TWIN cooling water system.

887. Large size( 2m in dia) flanges for mounting Twin source grids under test facility.

**Updated on 31/03/2023**

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**UHVS: Project Code: RIP4005-S6**

888. Dome Camera

**Updated on 06/04/2023**

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**UHVS: Project Code: RIP4007-S4-02**

889 Hydrothermal chamber (100 mL)  
890 Vacuum Oven  
891 Tube furnace  
892 Centrifuge  
893 Spin coater  
894 Double distilled water plant  
895 Magnetic stirrer  
896 Magnetic bars  
897 Thermometer  
898 Micropipette (10-100 microliter), (1000 microliter)  
899 Glass Beakers & Glass vials  
900 Glass Petri dish  
901 Torque wrench  
902 Mortar pestle  
903 Weighing balance  
904 Vacuum pump and Desiccator  
905 Gloves, mask and lab coat  
906 Vacuum cleaner (dry and wet)  
907 LED/LCD monitor  
908 Digital Vernier Calipers  
909 Chemicals

**Updated on 21/04/2023**

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**High Power ICRH Systems Division: Project Code: RIP4007-S3-01**

910. Fabrication of UHV Components as per drawing  
911. Fabrication of Phase Shifter as per drawing

**Updated on 24/05/2023**

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**NNB Division Division: Project Code: RIP4005-55**

912. Vector Network Analyser  
913. Insulation Resistance tester  
914. DC power supply components like Transformer, contactor, DCCT etc.  
915. Upgrade of HVPS control system  
916. AMC of Air circuit breakers  
917. Maintenance of 2MVA Transformer

**Updated on 07/07/2023**

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**High Temperature Technologies Division (HTTD): Project Code: RIP4007-S4**

918. Beam guidance basic unit 2011  
919. Adapter beam guidance basic unit 2001 to beam guidance basic unit 2011  
920. Digital Signal Processor (DSP) Adwin-Gold II (customized)

**Updated on 07/07/2023**

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**Technology development for High Power neutral beams: Project Code: RIP4005-S5**  
921. Water Flow switches with one micro switch contact, independently adjustable within the flow range

**Updated on 09/09/2023**

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**UHVSD Division: Project Code: RIP4005-S6**  
922. Metal Fencing Work in UHVS Lab

**Updated on 27/010/2023**

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**Division: Dean R&D**

**Section: Projects and Technology Transfer Section: Project Code: RIP4006-PTTS-IC**  
923. Setting up an office space for IPR's incubation center: This includes design work, fabrication of offices using MS sections, Aluminum partitions, electrical, lighting & IT cabling work etc.

**Updated on 27/010/2023**

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**Division: Dean R&D**

**Section: Projects and Technology Transfer Section: Project Code: NP010901**  
924. Procurement of office furniture: This includes the procurement of modular workstations, office chairs, meeting tables, reception table, conference table, almirah, cabinets etc.

**Updated on 27/010/2023**

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**Division: Microwave and plasma diagnostic division**

**Section: Microwave and ECE Diagnostics: Project Code: RIP-4007-S4-02**  
925. Procurement of Ultrasonic water bath (Sonicator)

**Updated on 29/011/2023**

**Division: PSED-Division division**

**Section: Plasma Nitriding: Project Code: RIP-4006-S2-03**  
926. Spares and Consumables for Transmission Electron Microscope (TEM)

**Updated on 29/011/2023**

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**Division: Advanced Tokamak Divisionn**

**Project: Pulsed Alternator**

**Project Code: RIP4005-S7-03**

927. Fabrication and supply of Housing shell with Flanges.  
928. Fabrication and supply of Shaft Assembly and support Assembly.  
929. Fabrication and supply of Rotor and Stator along with magnets for high power rotating system.  
930. Supply of Linear Position sensor with driver.  
931. Development, Fabrication, Assembly, Testing and supply of Controller unit for high power rotating system  
932. Electronic components for power converter.  
933. Smart Pirani vacuum Transducer cum transmitter.  
934. Fabrication and supply of NdFeB grade N-40SH Permanent magnets.

**Updated on 18/12/2023**

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**Division name:** Fusion Blanket Division

**Project name:** Fusion Technology

**Project Code:** RIP4005-S3

935. Hydraulic press

936. Viscometer

937. Rheometer

938. Microwave synthesis system

939 Repair/replacement of Nanosclerometer controller with power supply

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**Division: High Temperature Technologies Division**

**Budget Code:** RIP4005-S4

940. Workstation for CAD modeling and engineering simulations

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**Division:** Plasma Diagnostics Division

Section: Microwave and ECE Diagnostics

Budget code: RIP4007-S4-02

941. Single axis antenna positioner

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**Updated on 15/02/2024**

**Division:** Fusion Blanket Division

Budget code: RIP4005-S3

942. Magnesium powder

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**Updated on 12/03/2024**

**Division:** Advanced Tokamak

Budget code: RIP4005-S7-03

942. Manufacturing, Inspection, Assembly and supply of AMB Supported Energy Storage System (ASESS)

943. Supply of Full range vacuum gauge.

Budget code: RIP4006-S5

944. Fabrication, Assembly, Inspection and Supply of Support Structure for Soft Catch.

**Division:** Fusion Blanket Division

Budget code: RIP4005-S3

945. Hot Plate

946. Magnetic Stirrer with hot plate

- 947. Reagent bottles (PP,LDPE, HDPE, Borosilicate)
- 948. KBr dies
- 949. Heating mantle
- 950. Laboratory stirrer
- 951. Hydraulic press
- 952. Viscometer
- 953. Rheometer
- 954. Microwave synthesis system
- 955. Repair/replacement of Nanosclerometer controller with power supply

**Updated on 10/05/2024**

**Division:** Fusion Blanket Division

Budget code: RIP4005-S3

- 956. Niobium target
- 957. Molybdenum target
- 958. Tungsten target

**Division LCPC Division**

- 959. SS304L helium gas storage tank of medium pressure
- 960. CS helium gas storage tank of medium pressure
- 961. Concrete base construction work for helium storage tanks and pipe layout work
- 962. SS304, SS304L, SS316 and SS316L pipe (seamless and welded type) and tubes and its fittings
- 963. Pipe layout work.
- 964. Oil removal system for helium compressor.
- 965. Oil removal system for air compressor
- 966. Helium Compressor
- 967. Air compressor
- 968. Compressor cooling and ventilation system
- 969. Air blowers and pumps
- 970. Cryogenic long stem control valve of various sizes
- 971. Room temperature control valve of various sizes.
- 972. Safety valve
- 973. Burst disc
- 974. Calibrated and uncalibrated Silicon diode temperature sensor.
- 975. Temperature sensor monitor.
- 976. Electrical distribution panel.
- 977. Electrical cables and instrument wires
- 978. UPS.
- 979. Vacuum chamber
- 980. Heat exchanger-plate fin type.
- 981. Spares for turbines
- 982. Gas regulator
- 983. Pressure transmitter.
- 984. Differential pressure transmitter.
- 985. Spares of helium compressor

- 986. Spares of air compressor
- 987. Spares of gas chromatographs
- 988. Calibration gas for gas chromatographs
- 989. Helium gas
- 990. PLC
- 991. Root-rotary vacuum pump
- 992. Dry scroll pump
- 993. TMP (turbo-molecular vacuum pump)
- 994. Vacuum Gauges of different types
- 995. Vacuum Fitting and Vacuum valves
- 996. Industrial category Computer and server
- 997. MLI fixing tapes
- 998. Fabrication of MS/CS platform and mezzanine floor
- 999. LHe Dewar
- 1000. LHe transfer siphon
- 1001. CMM(Coordinate measuring machine)

**Updated on 04/07/2024**

**Division:** Advanced Tokamak Division

Budget code: RIP4006-S2-03

1002: Fabrication, Inspection and Supply of Long Plate Support Assembly (LPSA) and Short Plate Support Assembly (SPSA).

Project Code: RIP4006-S5

1003: Fabrication, Inspection and Supply of Support Plate Assembly (SPA) and Support Structure Assembly (SSA).

**Updated on 08/08/2024**

**Division:** Plasma Diagnostics Division

Budget code: RIP4007-S4-02

1004: Full Band Calibration and PC Software Update for the existing AB Millimetre Dual Channel Vector Network Analyser (8-220 GHz).

**Updated on 13/01/2025**

## **Annexure-A: (Updated on 25/01/2024)**

S. No.	Description of Item	Broad Technical Specifications/ Parameters
G1.	High current, low voltage constant current constant voltage power supply	3-4kA, 5-10V power supply
G2.	Electric - Vacuum feedthroughs	Vacuum range 1e(-9) Torr, >1kA DC
G3.	Electron Beam System	Flange Mounted low energy electron source, Energy Range :1eV to 2 keV, Flange size: 35 CF/ 63 CF, Beam Current: 1nA - 1microA, Variable beam spot size: 0.5mm - 5mm, Pulse width: 50ns - 100microsec, Power supply, Controllable: 0 - 2 keV, Control Range: 100mV, RS 232 Serial Protocol, Input: 230V 50Hz AC, GUI operation of the e-gun, Pulsing grid facility for emission control: 1 - kHz
G4.	Fast Camera	High speed video camera for plasma turbulence studies, Sensor: CMOS/CCD, Spectral range: 300nm- 800nm, Video: Monochrome, Inbuilt internal storage: 8 GB/16GB, Exposure: 1microsec - milisecond, Dynamic Range: 12 bit, Max frame rate: $2 \times 10^5$ fps (variable), Pixel Size: 10 micron - 20 micron, Resolution: 3Mp or higher, Shutter: Global exposure, Trigger: TTL, Trigger connector: SMA/ BNC, Frame storage: Compatible to open in PC, Software: GUI based camera control for all functionalities, Power: 230V 50 Hz
G5.	Camera and accessories	High speed camera, Sensor: CMOS/CCD, Spectral range: 400nm- 700nm, Monochrome, 100 microsec -5 milisecond, Max frame rate: $10^5$ fps (variable), Trigger: TTL, Trigger connector: SMA/ BNC, Frame storage: Compatible to open in PC, Software: GUI based camera control for all functionalities, Input Power: 230V 50 Hz
G6.	Ultra-High-Vacuum (UHV) Pump & Accessories	1000 - 2000 lit/s Non-evaporable getter - Ion pump Combo (NEG+Ion Pump)
G7.	Free field type D and type B dot sensors for transient Electromagnetic Pulse measurements and compatible accessories (e.g.balun, passive integrator, low loss cable of 0.5m, 1m, 2m and 5m)	Frequency: 0.010 GHz to 10 GHz; Rise time: $\sim 0.020$ ns; Maximum output: $\pm 150$ V; Output connector: SMA (m); Physical Dimensions: Our chamber has $\sim 10$ cm length, 30cm of diameter and a few radial ports for diagnostics. D dot and B dot sensors should be inserted inside these radial ports to measure field distribution. Due to constraint of the radial port, size of the D and B dot sensors should be restricted to: Length: 60cm (including Balun length), Height $\leq 1$ cm, Width: $< 3$ cm; Compatible Accessories (e.g., Balun, passive integrator, low loss cable of 0.5m, 1m, 2m and 5m, etc.) included
G8.	Free field type D and type B dot sensors for transient Electromagnetic Pulse measurements and compatible accessories (e.g.balun, passive	*Vacuum compatible D-dot Sensors *Vacuum compatible B-dot Sensors (Along with accessories such as Baluns, SMA feedthroughs etc.) 10 GHz frequency compatible.

S. No.	Description of Item	Broad Technical Specifications/ Parameters
	integrator, low loss cable of 0.5m, 1m, 2m and 5m)	
G9.	Signal Generator	Signal Generator 20 GHz
G10.	Real Time Spectrum Analyzer	
G11.	Waveguide components	Two piece gaskets consisting of silver plated metal frame and rubber seal ring
G12.	Pulsed S-band Magnetron with central frequency: 3.0 GHz	S-band Magnetron, central freq : 3.0 GHz $\pm$ 0.5%, pulsed power $\geq$ 3 MW, pulse duration 5 $\mu$ s, Duty cycle 0.001, Band width < 2 MHz, VSWR 1.5:1, along with electromagnet & electromagnet power supply ( <i>Pulsed modulator not in scope of supply</i> ).
G13.	Optical Wavelength Meter	CW mode of operation;330 nm to 1100 nm wavelength Range; Absolute accuracy of $\leq$ 80 MHz over 400 nm to 800nm; Measurement Resolution: $\leq$ 5 MHz; 8 digits or more display resolution;USB Instrument interface and software; Free beam to fiber coupler at Optical input.(Note: Optical Wavelength Meter is an accessory for Tunable Diode Laser to accurately measure the output laser wavelength)
G14.	Tunable Diode Laser	CW External Cavity Tunable Diode Laser (Littman/Metcalf MOPA Laser Head with Tapered Amplifier); Output Power: $\geq$ 500 mW @ 668 nm (Free Space), $\geq$ 200 mW @ 668 nm (After Fibre); Central wavelength 668 nm (10 nm tuning range); 30 GHz or more Mode-hop free tuning range;Linewidth of $\leq$ 200 KHz (5 $\mu$ s integration time); $\sim$ 2 mm Circular and Collimated (for Free space and fibre coupled outputs); Output beam quality: TEM00, Linear polarization, $>$ 100:1, M2 $\leq$ 1.5, $<$ 1 mrad divergence
G15.	Visible Spectrograph System with Detectors	<ul style="list-style-type: none"> <li>• Czerny-Turner Spectrograph with one entrance port and two exist ports</li> <li>• Holographic grating &amp; Toroidal optics</li> <li>• Focal Length : <math>\sim</math> 500 nm</li> <li>• Aperture: f/6 – f/7 with wide angle entrance slit</li> <li>• Wavelength : 400 – 800 nm with a resolution of 0.04 nm for 1800 l.mm grating</li> <li>• Input coupling: Free space and fiber couplings.</li> <li>• Light collection optics with fiber cable for target distance 500 mm to infinity</li> <li>• Single point detector (PMT) with HV power supply, housing, interface box and software</li> <li>• EMCCD Detector with control unit, power supply and software.</li> </ul>
G16.	Current leads	Current rating : 2-3 kA, Operating temperature: 77 K
G17.	Linear Displacement transducer	<ol style="list-style-type: none"> <li>1. Measurement capacity : 25 mm,</li> <li>2. Technology : Strain gauge type transducer,</li> <li>3. Non linearity : <math>&lt;</math>0.1% of Full scale, 4. Rated output : Voltage in mV/V,</li> <li>5. Excitation : 1 to 10 volt range,</li> <li>6. Operating temperature : -10 to +70 C,</li> </ol>

S. No.	Description of Item	Broad Technical Specifications/ Parameters
		7. Construction: : Stainless Steel/Aluminium, 8. Environmental Protection: IP54, 9. Cable: 2 Metre 4 Core Screened
G18.	Analog and Digital ICs	Different ICs for Sensors signal conditioning and Coil protection cards as per requirement for superconducting coil experiments
G19.	High Voltage breakdown tester	1.Equipment: Portable High voltage breakdown tester, 2.Voltage: 40 kV, DC, 3.Current: 40 mA, 4.Polarity : Positive, 5.Current operating mode: Adjustable current trip and current limit mode, 6.Operation mode: Remote and local, 7.Remote operation: 0-10V corresponds to 0-40 kV, 8.Output signals: 0-10V corresponds to 0-40 kV, 9.Output Signal: 0-10V corresponds to 0-40 mA, 10.External Trip: Yes, 11.Display : Digital with 0.1 % resolution
G20.	2G High Temperature Superconducting (HTS) Wire	
G21.	Bayonet couplings for cryogenic transfer line	1.Type: Male and Female as a single pair, 2.Max. Working Pressure : $\geq 16$ bar (A), 3.Operating Temperature Range : 55 -77 K, 4.Inner Pipe size : 1 Inch, 5.Cryogenic Fluid : Helium gas, 6.Orientation for installation: Vertical as well as horizontal, 7.Joint type : Bolted, 8.Material of construction - Stainless steel 304L / Stainless steel 316L, 9.Leak rate : $\leq 5 \times 10^{-8}$ mbar /lit sec
G22.	Stabil Ion Gauge	
G23.	Residual Gas Analyser	
G24.	High temperature bellow sealed valve (3/4 inch pipe end connection)	Temperature~ Up to 400°C, Type: Manual Bellow sealed valve, Pressure: Up to 12 bar, Helium Leak rate: $1 \times 10^{-8}$ std cc/s , End connection:3/4 inch pipe end connection
G25.	AFT Arrow software	
G26.	Lithium (Li) Material	
G27.	1/2" bellow seal valve	Size: 1/2 inch, Operating temperature: 450°C, Operating pressure: 5 bar
G28.	Cryocooler Assembly (with standard accessories)	
G29.	CFC (Carbon Fiber Composite) tiles for IR (infrared) imaging based beam diagnostics on INTF	CFC plates of <ul style="list-style-type: none"> <li>• Dimension (L×W×T : 400mm×160mm×15mm).</li> <li>• Melting temperature : <math>\approx 2000</math> deg Centigrade.</li> <li>• Maximum power density withstand <math>\sim 40</math>MW/m<sup>2</sup> for 3 sec.</li> <li>• Thermal conductivity along Thickness T &gt;&gt; Lateral (along L and W) thermal conductivity.</li> <li>• Density in the range of 1.4 – 1.75 gm/cm<sup>3</sup>.</li> </ul>

S. No.	Description of Item	Broad Technical Specifications/ Parameters
		<ul style="list-style-type: none"> <li>• Ash content: Less than 100 ppm.</li> <li>• High vacuum (~ 10<sup>-7</sup> mbar) compatible.</li> <li>• Machinable (for cutting and drilling).</li> </ul>
G30.	Ion Pump with Controller	
G31.	Solidworks software license for haptic interactions in Virtual Reality facility	Easy 3D Modelling and Drawing Creation; User Graphic Interface; Simplified Drawing Creation Tool; In built Time Saving tools; Enhanced Surfacing & Sheet Metal Tools; Faster Design Data Exchange; Best Integrated CAD Software for Simulation Study
G32.	Motors, gearbox, and control system components for Dual-Arm Manipulator (DAM) and Winch	Specifications being finalized
G33.	Motors, gearbox, encoder, brake, and control system components for VR controlled RH equipment	Servo motor with integrated gear box, DC geared motor with absolute encoder and brake, motor with PTFE cables, motor ball bearings with compatible vacuum grease, gear lubricated with compatible vacuum grease, nominal voltage 24 V, nominal speed ~9000 rpm, continuous torque 15 Nm, mass inertia 15 gm <sup>2</sup> , max. transmittable power (continuous) 55W, avg. backlash no load less than 1 deg., max. radial load 360 N, max. axial load (dynamic) > 150 N, programmable positioning controller- Master and Slave, cable set for programmable positioning controller - Master and Slave
G34.	Cernox temperature sensor-Calibrated	Calibrated cernox temperature sensor with measuring range of 2 to 325 K and inaccuracy of < 20 mk in the range 2 to 10 K
G35.	Silicon diode temperature sensor-Calibrated	Calibrated silicon diode temperature sensor with measuring range of 2 to 325 K and inaccuracy of < 20 mk in the range 2 to 10 K
G36.	Silicon diode temperature sensor-Uncalibrated	Uncalibrated silicon diode temperature sensor with measuring range of 2 to 325 K and inaccuracy of < 100 mk in the range 2 to 10 K
G37.	Monitor for cryogenic temperature sensor	Continuous 8-input display with readings in K, °C, V, or Ω Supported sensors : Diodes: Silicon, GaAlAs RTDs: 100 Ω Platinum, 1000 Ω Platinum, Germanium, Carbon-Glass, Cernox™, and Rox™ Excitation : 8 constant current sources Measurement type : 4-lead differential Interface and Serial interface RS-232C
G38.	Xenon Gas Cylinders	> 99.5 % Purity
G39.	Hollow Cathodes	10 Amp
G40.	Oxygen Free Electronic (OFE) copper plate	
G41.	Add-on 633 nm laser with live track for existing procured Raman Spectrometer	Helium Neon laser, 17 mW at 633 nm, air cooled, for external mounting on laser baseplate, which is kinematically mounted onto the system baseplate. • Plasma filter for 633 nm. • White Light Tracking for 633 nm • Kinematically mounted, magnetically attached, Rayleigh line rejection filter set for 633 nm excitation, paired filters, allowing Raman measurements down to 50 cm <sup>-1</sup> from the laser line. • Mirror



S. No.	Description of Item	Broad Technical Specifications/ Parameters
		steering optics, fully optimised for the visible range, with beam expander assembly. • Grating on magnetically attached kinematic mount, 1800 lines mm-1.
G42.	Polarization Kit for 532 nm add on part of for existing procured Raman Spectrometer	Polarisation optics assembly • Laser Polarization Control Kit for 532 nm • Circular Polarizer (quasi-depolarizer) (¼ wave plate) • Polarization Rotator (½ wave plate) • Polarization Analyzer Kit for 532nm • Polarization Analyzer • Polarization Rotator (½ wave plate) .software controlled of renishaw
G43.	SIIP software for material surface characterisation	Capability for analysing nanostructures, nanoparticles, FFT, contours, profilometry etc.
G44.	Scanning Near-Field Optical Microscope (SNOM)	
G45.	High voltage high frequency power supply	5 -20 kHz, 20 kV, 2 kW
G46.	RF power supply with matching network	1kW RF power supply with automatic matching network
G47.	Multi pocket electron beam evaporator	
G48.	Supply, installation & commissioning of a solid state RF (13.56 MHz) Generator of 1000 W capacity, along with compatible automatic matching network	
G49.	Lens Power supply TDK 72 V, 40 A; for TEM	72 V, 40 A power supply for the existing TEM
G50.	Portable Flue Gas Analyzer	Flue gas temperature measurement 0-500 °C, Oxygen 0-25%, CO 0-1000 ppm, NO 0-4000 ppm, NO <sub>2</sub> 0-1000 ppm, SO <sub>2</sub> 0-5000 ppm, Pressure -200 to +200 hPa, CO <sub>2</sub> by calculation, Gas velocity sensor, Flue gas probe should have filters in the path, System should comprise of probe, sensors and control unit with display, memory to store 50000 readings, in-built rechargeable battery, auto-controlled pump for collecting sample, integrated moisture analyzer, automatic fresh air rinsing, sample cooling, condensate trap, auto dilution of all sensors.
G51.	Cryogen free PPMS/CFMS with magnetic measurement module (VSM)	9Tesla Superconducting magnet based physical property measurement system/ with magnetic measurement module viz. Vibrating Sample Magnetometer with a temperature range of 1.8K to 400 K
G52.	Pulse-Forming Network and HV Power Supply (Local Supplier)	Energy Storage Capacitors 5 microF, 50 kV, Triggered Spark gaps, HV Charging power supplies
G53.	Linear amplifier, (foreign)	Max Voltage +/- 150 V, current 0.5 A
G54.	Microwave cables (foreign)	SMA-SMA, 18.0 GHz

S. No.	Description of Item	Broad Technical Specifications/ Parameters
G55.	BNC Cables	50 Ohm
G56.	Toridal Ferrite Core	Ni-Mg, high frequency 100 MHz
G57.	Semi-rigid cables	RG402 & RG-405, length 40.0 cm
G58.	N-type Bulk-head	Panel mount, hermetic sealed
G59.	Ceramic tubes	single bore, ID=2.7 mm, OD = 4.0 mm;
G60.	Ceramic tubes	Single bore, ID=3.5 mm, OD = 5.0 mm;
G61.	Electropneumatic gate vale	DN 100 CF , cycles 50000
G62.	RF power supply with matching network (Local)	Frequency 13.56 MHz Power= 300 W
G63.	Miscellaneous consumable items	Tungsten wire, copper wire and plasma source development material
G64.	In-line IV probe	In-line RF voltage, current and phase measurement system, Voltage Range: 20V – 3000 Vrms (Accuracy: ± 1% or Lower), Current Range: 0.1 – 20 Arms (Accuracy: ± 1% or Lower), Phase Range: ± 90° or Higher (Accuracy: ± 10° or Lower) Fundamental Frequency: 13.56 MHz, Harmonic: At least 4, RF Power real, forward and reflected: 1 kW or Higher
G65.	Boron lined proportional counter	Length : 300 mm to 400mm, Daimeter 20 mm to 30 mm, Effective length 200 to 350 mm, High purity aluminium cathod, HN connector, 4 cps/nv sensitivity
G66.	Wien filter with it's power supply, control & command system and all accessories	The design will be based on a Wien filter with a fixed magnetic field (with rare-earth permanent magnet circuit) and a set of electrostatic plates. It should be integrated in a stainless steel vacuum chamber, equipped with support feet to achieve 200mm height from bottom feet to beam axis. Two high voltage power supplies (5kV, 2mA) necessary to power the Wien filter and control & command system should be provided.
G67.	RF Signal generator	Frequency Range(Hz)-9 KHz-3 GHz; Maximum Output Level (dBm) ≥13; Minimum Output Level (dBm) -120 or better; Reverse Power Protection (watt) ≥2; VSWR on all operating frequencies ≤ 1.9; Maximum Amplitude Modulation Frequency at f > 100KHz – 20 KHz; Minimum Amplitude Modulation Frequency at f > 100KHz – 10 Hz; Maximum Frequency Modulation Frequency (-3 dB) Standard -20 KHZ; Minimum Frequency Modulation Frequency (-3 dB) Standard -10 HZ; Minimum frequency deviation- 20 KHz; Memory( min.storage settings) -10 ; RF Analog sweep Shall be available;
G68.	Vector Network Analyzer with frequency range 2MHz-3 GHz	

S. No.	Description of Item	Broad Technical Specifications/ Parameters
G69.	Vertical Field Power Supply for Aditya-U and SST-1 tokamak	9kA, 6kV, Vertical Field DC power supply with all accessories.(pulse duty)
G70.	Wire wound mesh resistors used for capacitor charging 550 kW, 30kohm, 1A, 29kV(pulse)	
G71.	Residual Gas Analyzer with spares	1 - 100 AMU, Better than 1 amu resolution, capable to operate in 1.0e-4 to UHV range, Minimum detection unit: < 1.0e-10 torr, 35CF probe mounting flange
G72.	Turbo Molecular Pumps	1900 l/s N2, Ultimate pressure at the TMP inlet $\leq 1.0 \times 10^{-7}$ mbar, Air / Water cooled, 250CF Vertical or Horizontal Mounting,
G73.	Cryo Pump	250/300CF, 9500 l/s H2O, <1.0e-7 base vacuum at inlet flange, capacity for hydrogen > 15 standard liters, Two stage - 50 to 75 K first stage and 10 - 20, cryopump body leak rate <1.0e-9 mbar.lit/sec
G74.	UHV Gate Valve	250 CF Electro Pneumatic Gate Valve, differential pressure 30 mbar, leak rate of Valve housing and seal <1.0e-9 mbar.lit/sec, Stainless Steel housing
G75.	Liner/ Rotary Motion Feedthrough	Stroke length 15 - 50 cm, <1.0e-9 m.l/sec leak rate, made out of SS with UHV rotary drive, 35 CF
G76.	UHV edge welded bellows	Displacement 300-450 mm, <1.0e-9 m.l/s for 63/35 CF End flange
G77.	UHV viewport shutter	150CF, 100CF, <1.0e-9 m.l/sec leak rate, made out of SS with UHV rotary drive
G78.	Piezo gas leak valve and Mass Flow Controller	0-500 SCCM, 2 milli second response time, 50 psig inlet pressure, Closed leak rate <1.0e-9 scc/sec
G79.	Palladium Membrane based Hydrogen Purifier	Outflow 5 to 7 slpm, Outlet hydrogen purity 99.99999% or better with 99.99% pure inlet hydrogen
G80.	Turbo Molecular Pump	700 l/s N2, Ultimate pressure at the TMP inlet $\leq 1.0 \times 10^{-7}$ mbar, Air / Water cooled, 150CF Vertical or Horizontal Mounting
G81.	High Pressure Gauge with digital read out and extra gauge head	1 - 5000 torr; Baratron type, accuracy 0.5 % of reading, 16 CF gauge mounting flange
G82.	Vacuum Gauge (Pirani/Cold cathod combination gauge, Pirani/B-A Combination gauge, Convatron gauge etc.)	Standard specifications
G83.	Molecules Detection Spectrometer for Lithium	Wavelength peak at 2200 nm
G84.	Fast feedback power supply (FFPS)	Rating: 300 V, +/- 3 kA.For real-time position control of plasma.
G85.	Divertor power supply	Rating: 500 V, 30 kA. For shaped plasma operation.

S. No.	Description of Item	Broad Technical Specifications/ Parameters
G86.	DC Current Transformer (DCCT)	+/- 2 kA. Frequency response: DC- 3 kHz
G87.	DC Current Transformer (DCCT)	+/- 5 kA. Frequency response: DC- 3 kHz
G88.	DC Current Transformer (DCCT)	+/-14 kA. Frequency response: DC- 3 kHz
G89.	DC Current Transformer (DCCT)	+/- 20 kA. Frequency response: DC- 3 kHz
G90.	Beryllium Foil	10 micron
G91.	Amplifier, Preamplifier for radiation detectors	Based on detector specifications
G92.	Femto Second Laser	300 mW, 100 MHz repetition rate
G93.	Nd:Yag Laser	3 J per pulse 50 Hz repetition frequency 1064 nm laser
G94.	Quartz crystal micro balance with spare	frequency 5 MHz
G95.	Ion-Pump Power Supplies for Gyrotrons (Spare)	Voltage: 3kV & 5kV selective Current range: 0 to 0.1mA, 1mA, 10mA and 100mA Power supply with 5 meter long HV cables HV Power terminations: Suitable to connect the Gyrotron Power supply showing the status the of vacuum in Gyrotron as good vacuum, rough vacuum and bad vacuum Interlock: The power supply suitable should generate a signal to interlock if ionpump current exceeds certain value (selectable like 0.1mA , 0.2mA and 0.5mA)
G96.	A pulsed white light source	Total visible power (350-850nm) >50mW and repetition rate >25MHz in visible IR wavelength range.
G97.	Interference band pass filters	<b>Diameter: 50.0 (±0.2) mm; Thickness (mm): 6.0 (±0.1) mm; Clear aperture CA (mm) &gt; 90% (filters coated to edge); Angle of incidence: 4.8° ±0.25° Collimated; Surface quality:60-40; Coating: AR coating on S2; Parallelism:&lt; 3 arc minute; Substrate: Fused Silica</b> 1. Centre Wavelength (CWL):1064 nm nominal; FWHM: 2.8 nm; 90% Bandwidth: ≥ 1.7 nm; OD2 Bandwidth: ≤ 3.8; Tpeak > 95% @ 1064 nm 2. Centre Wavelength (CWL):1057 nm nominal; FWHM: 9.4 nm; 90% Bandwidth: ≥ 7.8 nm; OD2 Bandwidth: ≤ 11.0 nm; Tpeak > 95% @ 1057 nm; ODabs > 6 @ 1064 nm 3. Centre Wavelength (CWL): 1044 nm nominal; FWHM: 14.5 nm; 90% Bandwidth: ≥ 11.3 nm; OD2 Bandwidth: ≤ 17.6 nm; Tpeak > 95% @ 1044 nm; ODabs > 6 @ 1064 nm 4. Centre Wavelength (CWL): 1028 nm nominal; FWHM: 17.5 nm; 90% Bandwidth: ≥ 13.4 nm; OD2 Bandwidth: ≤ 21.6 nm; Tpeak > 95% @ 1028 nm; ODabs > 6 @ 1064 nm 5. Centre Wavelength (CWL): 985 nm nominal; FWHM: 67.5 nm; 90% Bandwidth: ≥ 61 nm; OD2 Bandwidth: ≤ 74 nm; Tpeak > 95% @ 985 nm; ODabs > 6 @ 1064 nm 6. Centre Wavelength (CWL): 900 nm nominal; FWHM: 97.5 nm; 90% Bandwidth: ≥ 85 nm; OD2 Bandwidth: ≤ 110 nm; Tpeak > 95% @ 900 nm; ODabs > 6 @ 1064 nm

S. No.	Description of Item	Broad Technical Specifications/ Parameters
		7. Centre Wavelength (CWL): 1078 nm nominal; FWHM: 18 nm; 90% Bandwidth: $\geq 13.5$ nm; OD2 Bandwidth: $\leq 22.5$ nm; Tpeak > 95% @ 1078 nm; ODabs > 6 @ 1064 nm
G98.	Heterodyne Interferometer System and its components	1. W-band externally biased balanced mixer (95 to 105 GHz): RF frequency 95 to 105 GHz; LO frequency 95 to 105 GHz; If frequency DC to 10 GHz. 2. PLL (phase locked loop) based mm wave source (100 GHz): Output frequency 100.000GHz; Output Power :15dBm or better, 3. PLL (phase locked loop) based mm wave source 100.850 GHz: Output frequency 100.850GHz; Output Power :15dBm or better, 4. D-band externally biased balanced mixer and PLL source (110 to 170 GHz) and associated millimeter wave components for Heterodyne Interferometer System
G99.	Heterodyne Interferometer system in W-band (100GHz) and D-band (140 GHz) Frequency range	Frequency - 100 and 140 GHz
G100.	PLL source – 75 to 170 GHz	Freq. 75 to 110 GHz
G101.	Balance mixer 75 to 170 GHz	Freq. 75 to 110 GHz
G102.	Passive waveguide components (1) Directional coupler (2) Waveguide section of different length. (3) Waveguide bends (4) Waveguide Transition (5) Waveguide Twist (6) Waveguide Termination (7) Waveguide switch (8) Waveguide filter	Freq 75 to 170 GHz
G103.	Freq Doublers	Input Freq 5 to 20GHz
G104.	Amplifiers (Gain blocks)	Freq 5 to 40 GHz
G105.	Mixers (IQ and Balanced)	Freq 5 to 40 GHz
G106.	Analog Signal Generator	Freq 10MHz to 40 GHz
G107.	Passive waveguide components 1) WR28 and WR42 Straight Sections of different lengths 2) WR28 90deg Bends E & H 3) WR42 Twist	Freq 5 to 40 GHz
G108.	Cables and connectors	Freq 5 to 40 GHz

S. No.	Description of Item	Broad Technical Specifications/ Parameters
G109.	Supply, Training & Installation of Dry Cryogenic Detection System	Dry Cryogenic Closed Loop Detection System consists of - (i) Cooled Detector (ii) Pulse Tube Cooler (iii) Compressor (iv) Multi Mesh Filters & (v) Low Noise Pre-Amplifier. Detector Element - Indium Antimonide (InSb); Detector Type Hot – Electron Bolometer; Operating Temperature $\leq$ 4.2 K; Operating Frequency Range - 60 GHz to 500 GHz
G110.	Wire grid Polarizers and mirrors 70 to 1 THz.	70GHz to 1 THz
G111.	Fixed Frequency Gunn Oscillators with isolator	Frequency 60-220GHz
G112.	Balanced Mixers	Frequency 60-220GHz
G113.	Band Pass Filter	Frequency 60-220GHz
G114.	Low Noise Amplifiers	Frequency 1-20 GHz
G115.	Noise Source	Frequency 90-220GHz
G116.	Passive Waveguide components like Twists, Transitions, bends etc	Frequency upto 220GHz
G117.	Zero Biased Schottky detectors	Frequency upto 40 GHz
G118.	Notch Filter	Frequency 42 GHz & 82 GHz
G119.	Lab Equipment : Signal Generator,Signal analyzer	Frequency upto50 GHz
G120.	Hydrogen Ion Source assembly	Ion Source: H <sup>+</sup> Ion source, Ion energy: 50 eV to 3 keV, Beam current 50 nA, Beam width 5 mm, Resolution( $\Delta E/E$ ): 5%, Selectivity: In steps of 50 eV throughout the energy range, Control units for the supplies and portability of the assembly.
G121.	Compact Neutral particle Analyzer (NPA)	Array of 2 by 10 CEMs(Channel Electron Multipliers) for the detection of Hydrogen and deuterium ions using EIB field arrangement, energy range 50 eV to 5 keV, capable of separating the H <sup>+</sup> & D <sup>+</sup> ions using velocity filter, with all the controls and power supplies.
G122.	Infrared (IR)-camera and allied accessories	Medium Wave IR-camera; Spectral range between : 1.5 to 6 $\mu$ m; Detector type: Closed Loop Stirling cooled detector; IR-camera pixel numbers/format: 640x512; Dynamic range 14 bit; Noise Equivalent Temperature Difference (NETD) $\leq$ 20 mK; temperature range from 20°C to 1500°C; Full frame rate upto 300 Hz; Higher frame rate in sub-windowing mode: Half frame:500 Hz, Quarter frame:1000 Hz, Line mode:4000 Hz. Lens assemblies to cover narrow and wide field of view; operating and control software for IR-camera with PC interface; thermography data access required in MatLab for post analysis
G123.	Wound Image Fiber Optical Bundle assembly	OD: 1.25 in, Format Size: 5mm by 6.7mm/180 inch length, N.A.-0.63, Bend Radius-4.0 inch, Sheathing: Interlocked stainless steel hose, End tip-C-mount adapter, Element size-10 micron, Relay lens, Objective lens

S. No.	Description of Item	Broad Technical Specifications/ Parameters
G124.	Wound imaging fiber bundle	Length ~2.5 meters, NA .63
G125.	High frame rate camera	Frame rate: $\geq 7000$ FPS; Resolution: $\geq 1$ MP
G126.	X-Ray image intensifier	X-Ray to visible range
G127.	Microchannel Plate (MCP) with Phosphor Screen	Gain: $\geq 1 \times 10^6$ ; Diameter: $\geq 40$ mm and $< 80$ mm
G128.	X-ray CCD detector	CCD format : $\geq 1024 \times \geq 250$ pixels, Image area : $\leq 27$ mm X 8 mm Detector cooling temperature : at least $-70$ °C Pixel readout rate : $\geq 2$ MHz Dynamic range : 16 bit Maximum spectra per sec : $\geq 150$ spectra in full vertical binning Interface – USB type Input/output signals : At least external trigger input and readout signal output
G129.	Palladium Membrane based Hydrogen Purifier O/P flow rate: 12slpm nominal	Palladium Membrane based Hydrogen Purifier with outlet flow rates 12slpm at 4bar pressure. Outlet hydrogen purity 99.99999% or better with 99.99% pure inlet hydrogen, Inlet up to 14 bar(g) Hydrogen Pressure, Supply Voltage 220-240 V AC, 50 Hz
G130.	Helium leak detector with helium pumping speed	Helium leak detector with helium pumping speed greater than equal to 2.5 l/s with Rotary backing Pump Capacity: $\geq 15$ m <sup>3</sup> /h and 10 l/s with Rotary backing Pump Capacity: $\geq 30$ m <sup>3</sup> /h, Measuring range: Vacuum mode $\leq 1E-11$ mbar l/s to $\geq 1$ mbar l/s and Sniffer mode $\leq 1E-8$ mbar l/s to $\geq 1$ mbar l/s.
G131.	Turbo molecular pump with pumping speed for N2 gas greater than equal to 1800 l/s having rotary pump with pumping speed greater than equal to 30 m <sup>3</sup> /h.	a) Ultimate pressure at the TMP inlet: $\leq 1.0 \times 10^{-7}$ mbar, b) TMP Cooling: Air / Water cooled, c) Mounting: Vertical or Horizontal, d) Single switch operation of pumping system which covers both TMP and the backing pump, e) Should have facility to monitor pump related parameters like pump current, temperature and power etc, f) Pump should get vented automatically in case of a power failure, g) Power supply: (a) For TMPs = 230 VAC, 50 Hz, Single phase, (b) For rotary pumps = 415 VAC, 50 Hz, Three phase / 230 VAC, 50 Hz, Single phase. Single phase will be preferred, h) Splinter / Protection shield should be provided at inlet of the pump, i) Heating arrangement for baking of TMP $\geq 120$ °C should be provided, j) Body leak rate of TMP: $\leq 1.0 \times 10^{-8}$ mbar l/s, k) Complete set of fittings for TMP with backing pump which are bellow, clamp, O-rings etc. should be provided for TMP system operation.
G132.	Turbo molecular pump with pumping speed for N2 gas greater than equal to 1200 l/s having rotary pump with pumping speed greater than equal to 18 m <sup>3</sup> /h.	
G133.	Turbo molecular pump with pumping speed for N2 gas greater than equal to 650 l/s having rotary pump with pumping speed greater than equal to 12 m <sup>3</sup> /h.	

S. No.	Description of Item	Broad Technical Specifications/ Parameters
G134.	Turbo molecular pump with pumping speed for N2 gas greater than equal to 350 l/s having rotary pump with pumping speed greater than equal to 12 m3/h.	
G135.	Turbo molecular pump with pumping speed for N2 gas greater than equal to 60 l/s having rotary pump with pumping speed greater than equal to 05 m3/h.	
G136.	Solar Imaging Telescope and its accessories (Optics, Mount, Compatible Imaging devices and accessories)	Solar Imaging Telescope with motorized mount, compatible Imaging devices and accessories
G137.	Spectrophoto-meter for UV-Vis-NIR with diffuse reflectance measurement	250-2500 nm for Diffuse Reflectance and 200-3300 nm for Transmittance and Absorbance

**Updated on 25/01/2024**