

Institute of Advanced Energy

Device list

as of November, 2023

No	Name of Device/System		Brief Description	Key Person
1.1	Heliotron J	High-temperature plasma experimental device of the helical-axis heliotron type	A leading experimental machine to study the nuclear fusion plasma confinement in the helical-axis heliotron magnetic field configuration: Major radius of the main vacuum chamber: 1.2 m Minor radius of helical coil winding: 0.22 m Average plasma minor radius: 0.15-0.2 m Helical coil winding: pole number: 1, toroidal pitch number: 4 Nominal magnetic field strength: 1.5 T.	Kazunobu NAGASAKI
1.2		Electron Cyclotron Heating (ECH) System	Plasma production and electron heating system based on electron cyclotron resonance, One unit of Gyrotron oscillator: 70GHz, 500kW, 0.2s Polarization Control System Wave-Launching System	Kazunobu NAGASAKI
1.3		Neutral Beam Injection (NBI) Heating System	This device injects high-energy hydrogen neutral beam into hot plasmas and heats the plasma. Acceleration voltage: 30 kV Acceleration current: 50 A Minimum beam divergence angle: 1.2 degree Proton ratio: 85% Pulse width: 0.2 s Neutralization efficiency: 60%	Shinji Kobayashi
1.4		ICRF Heating System	Heating system for ions and electrons in a plasma through waves in ion cyclotron range of frequencies (ICRF) are generated and injected into plasma for plasma heating. Range of Frequency: 17.8 MHz - 53.4 MHz, Max. Power: 3MW, Pulse Width: 0.2 s	Kazunobu NAGASAKI
1.5		Diagnostic System for Heliotron J	A Family of Diagnostic Devices for Heliotron J Plasma Experiments including Thomson Scattering Systems, A Charge Exchange Recombination, Spectroscopy System, ECE Radiometers, Spectrometers (Visible, VUV), Soft X-ray Detector Arrays, Hard X-ray Detectors, Microwave reflectometer, A Charge-Exchange Neutral Particle Energy Analyzer, A Beam Emission Spectrometer System, Interferometers, Magnetic Probes, Langmuir Probes, A High Speed TV camera System, A Residual Gas Analyzer, A Data Acquisition System, etc.	Takashi MINAMI
2	Two NMR machines (Bruker Avance III and DRX600, 600 MHz)		Analysis of chemical structure, three-dimensional structure, dynamics and interaction in solution as to biomass and biomolecules Observable nuclei: ¹ H, ² H, ¹³ C and ¹⁵ N Probe: TCl, highly sensitive cryogenic probe for ¹ H and ¹³ C nuclei	Masato KATAHIRA
3	Electrochemical Analyzer (BAS, BAS100B/W)		Electrochemical analysis/measurement for liquid samples Range of sensitivity: 100 nA/V-100 mA/V AC Impedance Module, Rotating Disk Electrode	Takashi MORII
4	Electron Linac for Free Electron Laser (Nissin-Denki, NKM-150K, NKM-250K)★		Electron accelerator to generate MIR wavelength region Free Electron Laser. Electron beams can also be available to irradiate samples. High pulse power Radio Frequency amplifier Thermionic cathode RF gun (AET, GP-500) Electron beam: Maximum acceleration energy of 40MeV, Maximum beam power of 60W in average. MIR-Laser: 3.4-25 μm, Maximum macro-pulse energy 80mJ@8 μm	Hideaki OHGAKI
5	Discharge-type Fusion Neutron Generator		Nuclear fusion device for neutron irradiation Neutron energy: 2.45MeV (monoenergy) Neutron yield: 10 ⁸ n/sec (CW) Distance between target and generator center: >20cm Continuous irradiation duration : < 8hrs/day	Juro YAGI
6	Low energy ion mill		Specimen preparation for TEM observation 100-2,000eV, Ion current more than 50 μA; 2.5 μm/h@500eV, 28 μm/h@2,000eV	Kiyohiro YABUUCHI
7	Electroporator		Gene transfer for cell Output Waveform: Exponential decay or Square wave Output Voltage: 10-500V (Low Voltage Circuit, CE module) 200-3000V (High Voltage Circuit, PC module)	Takashi MORII
8	Incubator shaker (Innova 4230)		Incubator for the shaking culture of microorganism Swing speed : 25-400rpm, Temperature range : 4-80°C	Takashi MORII
9	Ultrasonic disintegrator (ASTROSON model XL2020)		For ultrasonic disintegration of cell structure Maximum Output: 550W, Frequency: 19.8kHz	Takashi MORII
10	Vacuum Freeze Dryer (FZ-12SF)		For vacuum freeze drying for frozen samples 12 Port Drying Chamber	Takashi MORII
11	Photoluminescence Measurement system		Measurement of PL from functional materials Laser 325nm (10mW), 442nm(50mW), Detector : electric cooled CCD	Hideaki OHGAKI
12	Transmission electron microscope (JEM-20X JEX-20)		Microstructural observation Maximum accelerating voltage 200KV; Resolution 0.25nm (particles) 1.14nm (lattice); Available for high tilt angle	Kiyohiro YABUUCHI
13	Scanning Electron Microscope with Energy Dispersive X-ray Microanalysis (JSM-6500F EX-23000BU)		Observation of SEM images Resolution: 3.0nm, X-ray analysis from Na to U by Si(Li) X-ray detector	Kazunari MATSUDA

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14	Fluorescence Spectrophotometer (F-4500)	Achieves wavelength scanning with sensitivity and high-speed Wavelength range : 200-730 nm, Fluorescence anisotropy measurement is available.	Takashi MORII
15	Scanning Probe Microscope (Digital Instruments NANOSCOPE IIIa)	Scanning probe microscope which able to measure surface morphology and to probe local characterization such as force curve and surface potential. STM and AFM measurements are available in the environment in air and liquid.	Hiroshi SAKAGUCHI
16	Transmission electron microscope (JEM-2200FS)	Microstructural observation Maxium accelerating voltage 200KV; Resolution 0.23nm (particles) 0.1 nm (latticess); Available for high resolution	Kiyohiro YABUUCHI
17	Scanning electron microscope available in coarse vacuum condition (JSM-5600LV)	Observation of the reflected electron image in coarse vacuum condition Resolution: 3.5nm in high vacuum condition (30kV, WD6mm, secondary electron image) 5.0nm in low vacuum condition (30kV, WD8mm, reflected electron image) Vacuum: 10-270Pa	Kiyohiro YABUUCHI
18	Field Emission Scanning Electron Microscopy (FE-SEM)(ULTRA55)	Observation of material surface and fracture surface, the corresponding chemical analysis, crystal orientation and measuring residual strain Accelerated voltage 30KV; Hypersensitivity; Secondary electron detector; SDD type EDX; Equipping with EBSP	Kiyohiro YABUUCHI
19	Streak Camera(C6138s)	An instrument for measuring the variation in a pulse of light's intensity with time Resolution: 200 fs Spectral range:400-850nm	Hideaki OHGAKI
20	Ultracentrifuge with temperature control (XL-80K)	Adaptable solutions for separation, pelleting, harvesting & elutriation. Max Speed : 80,000rpm, 2 rotors were available (type 70.1, type 50.2)	Takashi MORII
21	High Speed Centrifuge with temperature control (Avanti HP-25)	Adaptable solutions for separation, pelleting, harvesting & elutriation. Max Speed : 25,000rpm, 3 rotors were available (JLA-10, JA-20, JA-21)	Takashi MORII
22	chromatochamber (ALS-720F)	Cold storage equipment (4°C) Temperature range 0-7°C Strage 1000 L	Takashi MORII
23	Clean bench (clean Air Equipment) (S-1300PRV)	Ventilated laboratory workspace for safely working with materials contaminated with (or potentially contaminated with) pathogens requiring a defined biosafety level. Single-Faced Type P-series. Air circulation type The air in working space by treatment with HEPA filter will rotate. HEPA filter last for a long time. W1300xD750xH1810mm	Takashi MORII
24	Freezers (ULT-1386-3)	Cold storage equipment (-80°C) Temperature range -65~-86°C, Strage 379 L	Takashi MORII
25	800 MHz LC-NMR/MS	800 MHz NMR combined with liquid chromatography and mass spectroscopy, Four channels	Masato KATAHIRA