

Institute of Advanced Energy

Device list

as of January, 2025

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, Microwave reflectometer, 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.	Shigeru INAGAKI
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: 1H, 2H, 13C and 15N Probe: TCI, highly sensitive cryogenic probe for 1H and 13C 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	Eiji NAKATA
4	Electron Linac for Free Electron Laser (Nissin-Denki, NKM-150K,NKM-250K)★	Electron accelerator to generate MIR wave length 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	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)	Eiji NAKATA
7	Incubator shaker (Innova 4230)	Incubator for the shaking culture of microorganism Swing speed : 25-400rpm, Temperature range : 4-80°C	Eiji NAKATA
8	Ultrasonic disintegrator (ASTROSON model XL2020)	For ultrasonic disintegration of cell structure Maximum Output: 550W, Frequency: 19.8kHz	Eiji NAKATA
9	Vacuum Freeze Dryer (FZ-12SF)	For vacuum freeze drying for frozen samples 12 Port Drying Chamber	Eiji NAKATA
10	Photoluminescence Measurement system	Measurement of PL from functional materials HeCd Laser: 325nm (10mW), 442nm(50mW), ns-Nd:YAG laser: 1064 nm, 532 nm, 355 nm, 266 nm, OPO (420-2300 nm), Detector : electric cooled CCD, Photomultiplier tube, gated ICCD, UV-VIS Spectrometer, samples can be cooled by 4K-cryocooler.	Hideaki OHGAKI
11	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
12	Fluorescence Spectrophotometer (F-4500)	Achieves wavelength scanning with sensitivity and high-speed Wavelength range : 200-730 nm, Fluorescence anisotropy measurement is available.	Eiji NAKATA
13	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

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14	Transmission electron microscope (JEM-2200FS) ★	Microstructural observation Maximum accelerating voltage 200KV; Resolution 0.23nm (particles) 0.1 nm (lattices); Available for high resolution	Takamasa OHMURA
15	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	Takamasa OHMURA
16	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
17	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)	Eiji NAKATA
18	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)	Eiji NAKATA
19	chromatochamber (ALS-720F)	Cold storage equipment (4°C) Temperature range 0-7°C Storage 1000 L	Eiji NAKATA
20	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	Eiji NAKATA
21	Freezers (ULT-1386-3)	Cold storage equipment (-80°C) Temperature range -65~-86°C, Storage 379 L	Eiji NAKATA
22	800 MHz LC-NMR/MS ★	800 MHz NMR combined with liquid chromatography and mass spectroscopy, Four channels	Masato KATAHIRA
23	Focused Ion Beam Systems (FB-2200) ★	Accelerating voltage 2 to 40 kV, maximum beam current 60 nA or higher, maximum beam current density 50 A/cm ² or higher, SIM image resolution 6 nm or lower, magnification (on display) 60 to 300,000x, Ga liquid metal ion source, low spherical aberration two-stage electrostatic lens	Takamasa OHMURA
24	X-ray Diffraction (RINT-TTR III) ★	X-ray source: rotating cathode type (rated output: 18 kW) Cu(18 kW), Co(12 kW), Mo(18 kW) Detector: SC, one-dimensional detector for high-energy X-rays 2θ angle range: 5° to 145°, Goniometer accuracy: within 0.01 Monochromator: Diffracted-line curved monochromator, X-ray irradiation area: a few mm to 20 mm	Takamasa OHMURA
25	Pulsed-RF Glow Discharge Optical Emission Spectrometer (GD-Profilier2) ★	Light emitting part: Lamp type Marcus type, sample application method 13.56MHz high frequency, high frequency output 0-300W (variable), pulse control (frequency) 1-100Hz (variable), duty 5-50% (variable), gas pressure 0-1000Pa (variable), anode diameter (standard) 4mm, cleaning mechanism motor control type Automatic cleaner	Takamasa OHMURA
26	NanoMill TEM Specimen Preparation System (Model1040) ★	The NanoMill system uses an ultra-low energy, concentrated ion beam to produce the highest quality specimens for transmission electron microscopy.	Takamasa OHMURA
27	Nuclear Magnetic Resonance Spectrometer(300 MHz)	NMR can be used to determine chemical structures in solutions. Especially, it can be used to identify organic synthetic compounds.	Eiji NAKATA
28	Isothermal titration calorimeter ★	ITC directly measures the changes in heat associated with intermolecular interactions in solutions.	Eiji NAKATA
29	Differential scanning calorimeter ★	DSC measures the sample stability and transition directly.	Eiji NAKATA
30	Plate reader	Plate reader can measure absorbance, fluorescence, luminescence, etc. It is also compatible with time-resolved measurements.	Eiji NAKATA
31	Circular Dichroism Spectrophotometer	Enables analysis of the stereostructure of optically active molecules	Eiji NAKATA
32	Mass Spectrometer (MALDI-TOF-MS)	MALDI-TOF-MS can be used to measure the absolute molecular weight of proteins, peptides and synthetic polymers.	Eiji NAKATA
33	Mass Spectrometer (ESI-TOF-MS)	ESI-TOF-MS can be used mainly for the measurement of the absolute molecular weight, especially small synthetic molecules, peptides, and nucleic acids.	Eiji NAKATA

★Cost a fee