

## ECATS question sheet on accelerators specifications and performances for YALINA, SAD, RACE experiments

(to be filled out only where applicable for the different types of accelerators)

<b>Accelerator</b>	Accelerator of neutron generator NG-12-1
Charged particles accelerated	Protons, deuterons
Accelerator Type (linac, circular)	Linear, horizontal
Main accelerator sections and type of structures	Emitter, ion guide, high voltage supply, vacuum pumping system, systems of oil and water cooling, systems of power supply, control and operation, target unit
Source type	Duoplasmatron ion source – arc plasma three electrode source with double control of gaseous discharge plasma
Source Extraction voltage	Extraction voltage 0÷25 kV, focusing voltage 0÷15 kV
RF system (amplifier characteristics)	Accelerating voltage 50÷250 kV, frequency of high voltage source operation 16 kHz, polarity – positive, maximum load current 30 mA, instability of rectified voltage by maximum current is ±0.5
Magnet system (type, size, rigidity, homogeneity)	Electromagnetic separator with side dimension - 670×550×565 (mm) is located on supporting mechanisms enabling horizontal and vertical shift in the range of 10 mm. The accuracy of setting is ±0.1 mm, inhomogeneity of magnetic field at workspace is 0.1%
Magnet Power Supply characteristics (current, stability, ramping, ...)	Technical parameters of electromagnetic system: - maximum induction of magnetic field - 0.26 Tl; - maximum excitation current 7A; - maximum coil voltage 250V; - angle of beam deviation 45°.
Total Power consumption	20 kWh
Cooling System	Ion source and starting electrodes at accelerating tube are cooled by oil. Oil pump capacity 8 L/min, maximum oil pressure in cooling circuit 0.4 MPa, oil volume 10 L. System of distilled water cooling is three-circuit one: first circuit removes heat from ion guide elements, target and high vacuum and oil pumps. Inlet water pressure is 1 at, water flow – 0.03 m <sup>3</sup> /hour. The volume of water in the first circuit is 3m <sup>3</sup> .
<b>Beam Characteristics</b>	
RF structure (RF frequency, phase width)	Modes of accelerator operation are continuous and pulse ones. By continuous mode of operation maximum current of ion beam (ion energy 250 keV) is 10 mA. By pulse mode ion source operates with frequency from 0.01 to 100 kHz.

	Pulse duration is set discretely: 0.6; 1; 2; 5; 10; 20; 33; 65; 130 mks. Ion current at the target is adjusted from 0 to 10mA.
Macro pulse structure (filling of RF pulses)	-
Long duration Beam Pulse characteristics (duty cycle, ...)	-
Final beam energy	-
Beam energy spread and stability	Ion energy spread in the beam is in limits of 1.5%.
Final beam intensity (average, peak)	-
Beam intensity stability	Deviation of maximum beam current at the target during 30 min is no more than $\pm 1$ mA.
Beam footprint characteristics	Maximum diameter of ion beam is 30 mm.
Beam footprint stability	Stable
Beam emittance at the high energy end	-
<b>Available Beam Diagnostics</b>	
Internal beam monitoring (intensity, phase,...)	Transportation of ion beam along the ionguide is controlled by diaphragms. Beam current is controlled by two current collectors, one of which is located in front of the target
Extracted beam monitoring (energy, intensity, position, ...)	-
<b>Beam delivery line</b>	
Focusing systems	Ion beam focusing is performed by means of two electromagnetic lenses. Maximum gradient of magnetic field induction is 4 Tl/m; maximum excitation current is 0.65 A.
Momentum Analysis (e.g achromat..)	-
Beam Position Scanning System	-
<b>Beam Time-Control</b>	
Pulsing of Source (minimum/maximum pulse width, rise and fall time, repetition rate)	Maximum pulse width 30 mm, rise time 100 ns, fall time 500 ns, repetition rate 10Hz-1000Hz
Pulsing of RF (minimum/maximum pulse width, rise and fall time, repetition rate)	-
Beam stretching characteristics including intensity reduction	-
<b>Beam Safety Shutdown</b>	-
Shutdown mechanism	-
Switch-off time	-