

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)

RACE Project Linear Electron Accelerator Characteristics

The following data is for the ISU RACE accelerator; the UT RACE accelerator is being assembled. It has some new components and has not been fully characterized.

Accelerator	
Charged particles accelerated	Electrons
Accelerator Type (linac, circular)	Linac
Main accelerator sections and type of structures	Microwave, S-band, 2856 MHz
Source type	Thermionic Triode
Source Extraction voltage	Up to 20 kV
RF system (amplifier characteristics)	10 kW modulator + klystron
Magnet system (type, size, rigidity, homogeneity)	Many Magnets. Klystron Solenoid, 2 Guide Solenoids, 4 pairs Steering, 90° Dipole
Magnet Power Supply characteristics (current, stability, ramping, ...)	EMI TCS used for large loads, Lambda Z-Up for Smaller loads
Total Power consumption	Approx 40 kW 208 3-phase
Cooling System	Water
Beam Characteristics	
RF structure (RF frequency, phase width)	S-Band 2856 MHz
Macro pulse structure (filling of RF pulses)	8 μ s
Long duration Beam Pulse characteristics (duty cycle, ...)	indefinite
Final beam energy	20-25 MeV
Beam energy spread and stability	unknown
Final beam intensity (average, peak)	80 mA peak, 50 mA average at peak energy
Beam intensity stability	
Beam footprint characteristics	1-2 mm dia.
Beam footprint stability	
Beam emittance at the high energy end	Near zero over the short path length
Available Beam Diagnostics	
Internal beam monitoring (intensity, phase,...)	None
Extracted beam monitoring (energy, intensity, position, ...)	90 ° Dipole. Inductive monitoring in addition to a collimated Faraday Target
Beam delivery line	
Focusing systems	None
Momentum Analysis (e.g achromat..)	None
Beam Position Scanning System	None

Beam Time-Control	
Pulsing of Source (minimum/maximum pulse width, rise and fall time, repetition rate)	100 ns to 5 μ s Wide, approx. 10 ns rise/fall, 90 Hz
Pulsing of RF (minimum/maximum pulse width, rise and fall time, repetition rate)	8 μ s Fixed, 90 Hz
Beam stretching characteristics including intensity reduction	
Beam Safety Shutdown	
Shutdown mechanism	Building and machine interlocks
Switch-off time	