

Technical specifications

1 pc. pump laser system for driving the high-energy THz source at ELI-ALPS with the following parameters.

The laser system has to provide two output ports (A) and B)), capable to be operated simultaneously but independently from each other, with the following specifications:

Output A):

Central wavelength : 1.0 μm - 1.25 μm

Pulse duration: 400 fs - 500 fs

Pulse compression, relative deviation from the Fourier limit: <3%

Pulse energy: >500 mJ

Energy stability (pulse-to-pulse): <2% rms

Repetition rate: minimum 50 Hz. Allowed increase of the repetition rate above 50 Hz: should be divisible by 10 without remainder.

Spatial mode, beam quality: TEM₀₀, M² <1.2

Beam pointing stability: <5% of beam size, rms; <10% of divergence angle, rms

Temporal pulse contrast: time interval >100 ps before the main pulse: >1000:1,
time interval >2 ps (<100 ps) before the main pulse: >200:1

Polarization contrast: >500:1

The pulse energy of output A) should be variable continuously or in small steps, without any significant variation of the spatial and temporal parameters of the beam.

Output B):

Central wavelength : 0.75 μm - 1.25 μm

Pulse compression, relative deviation from the Fourier limit : <5%

Pulse energy: >1 mJ

Energy stability (pulse-to-pulse): <1% rms

Repetition rate: \geq 1 kHz

Spatial mode, beam quality: TEM₀₀, M² <1.2

Beam pointing stability: <5% of beam size, rms; <10% of divergence angle, rms

Temporal pulse contrast: time interval >100 ps before/after the main pulse: >1000:1,
time interval >2 ps (<100 ps) before/after the main pulse: >200:1

Polarization contrast: >1000:1

General conditions:

Warm-up time: <60 min

Synchronizability to an external clock signal

Software control and alignment (Number of intervention/tuning points to maintain 10 hours of problem-free daily operation: \leq 4)

Outputs A and B should be synchronized to each other with a jitter less than 50 fs

Synchronizability of outputs A) and B) to each other with <50 fs time jitter

The pulse energy of output A) should be variable continuously or in small steps