

eli



beamlines

ELI-Beamlines Laser Team

50 people with different specialisations



Fyzikální ústav
Akademie věd
České republiky



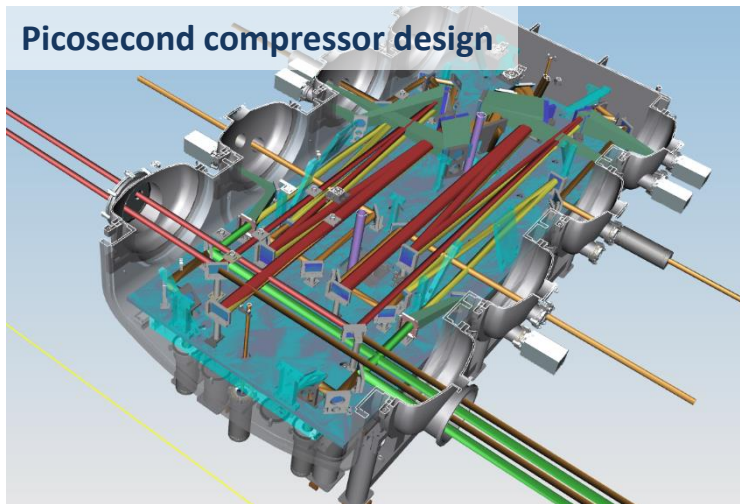
EVROPSKÁ UNIE
Evropské strukturální a investiční fondy
Operační program Výzkum, vývoj a vzdělávání



MINISTERSTVO ŠKOLSTVÍ,
MLÁDEŽE A TĚLOVÝCHOVY

Development & operation of high-power lasers

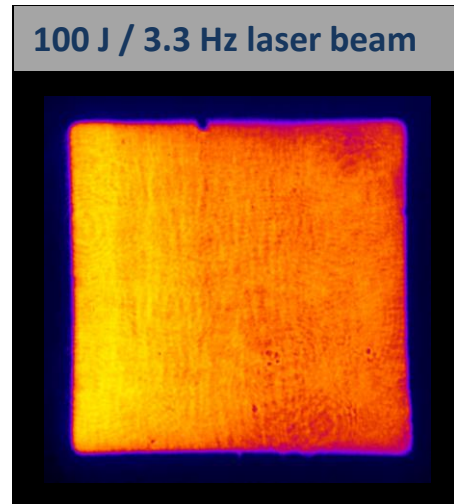
Picosecond compressor design



Ultra-broadband optical generation



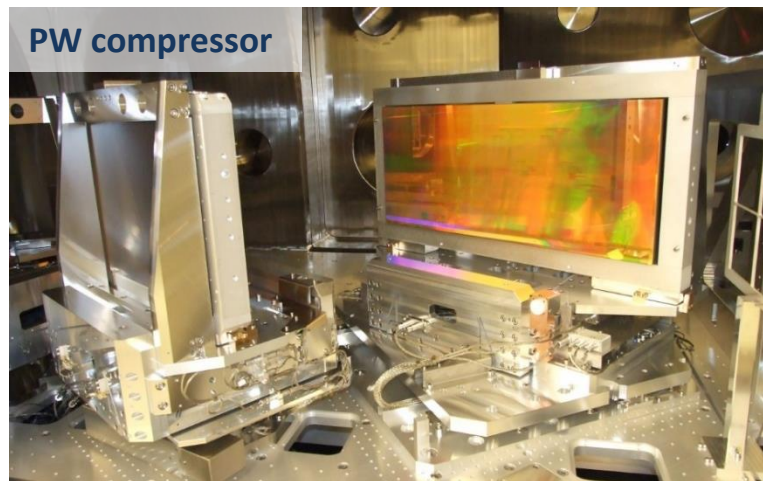
100 J / 3.3 Hz laser beam



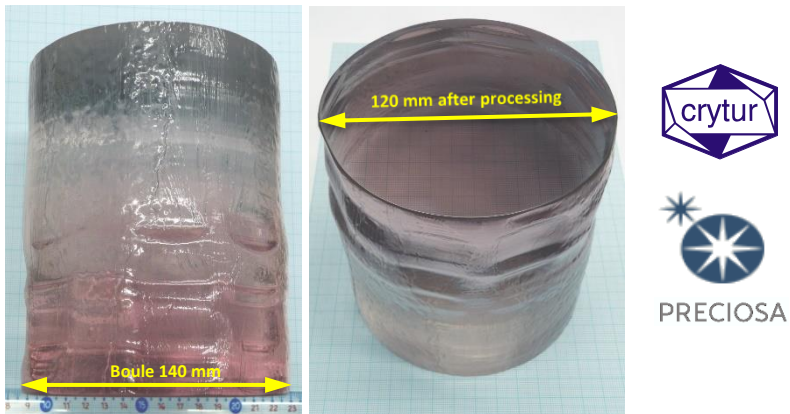
L3-HAPLS operation



PW compressor



Large laser monocrystals



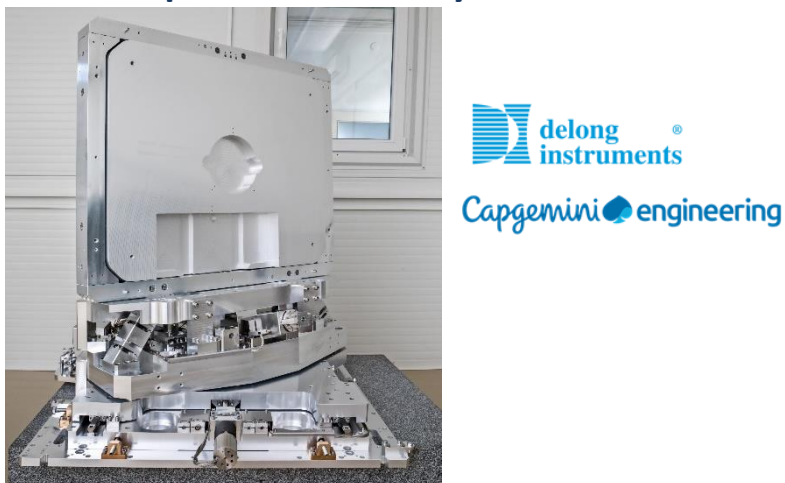
Currently world's largest Yb:YAG laser-quality monocrystals

Innovative cryogenic engines for lasers



Compressor / turbine wheels 120 000 rpm

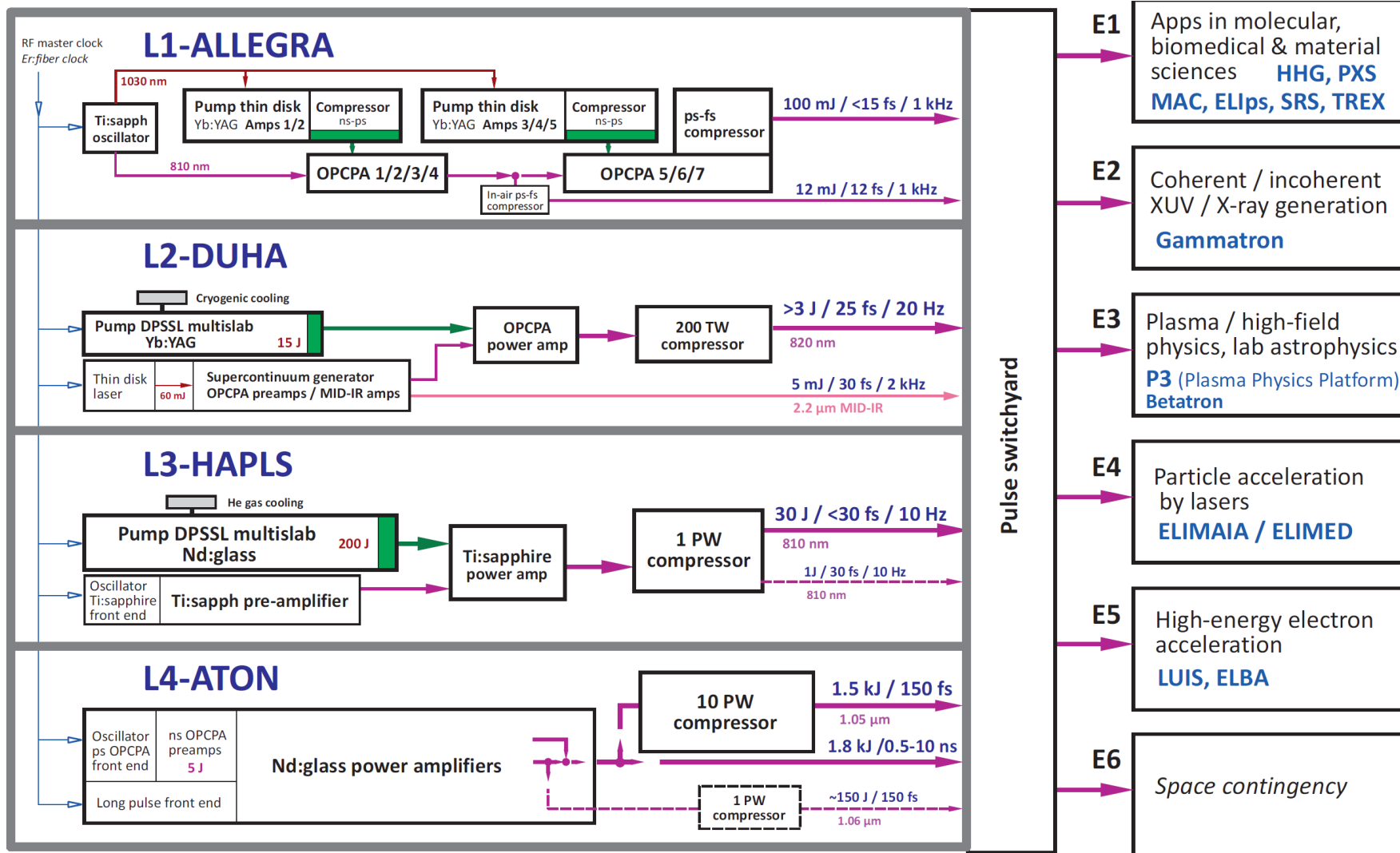
Innovative optomechanical systems



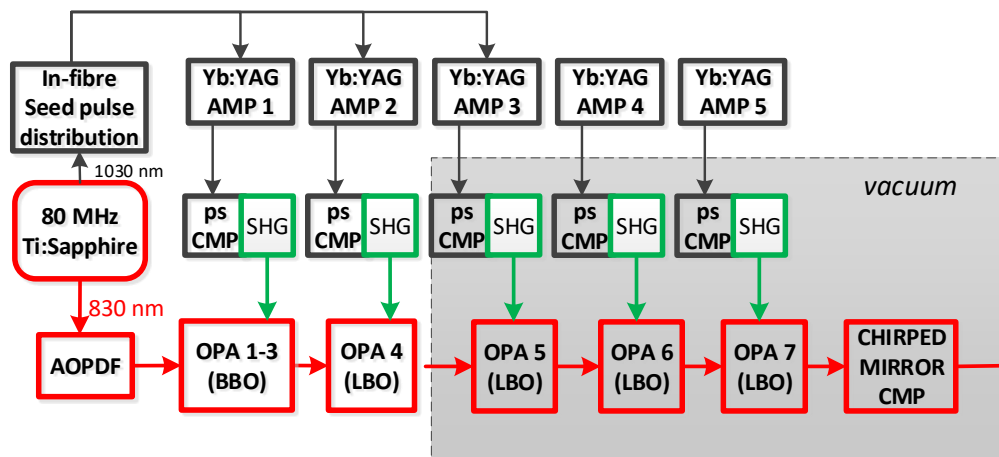
Optical coatings of large mirrors



ELI-Beamlines laser systems: cutting edge technology



L1-ALLEGRA laser system



>100 mJ / 12 fs / 1 kHz
ready upgradeable to >200 mJ

Current performance
(OPCPA stage 7 partially pumped):
55 mJ / 16 fs / 1 kHz

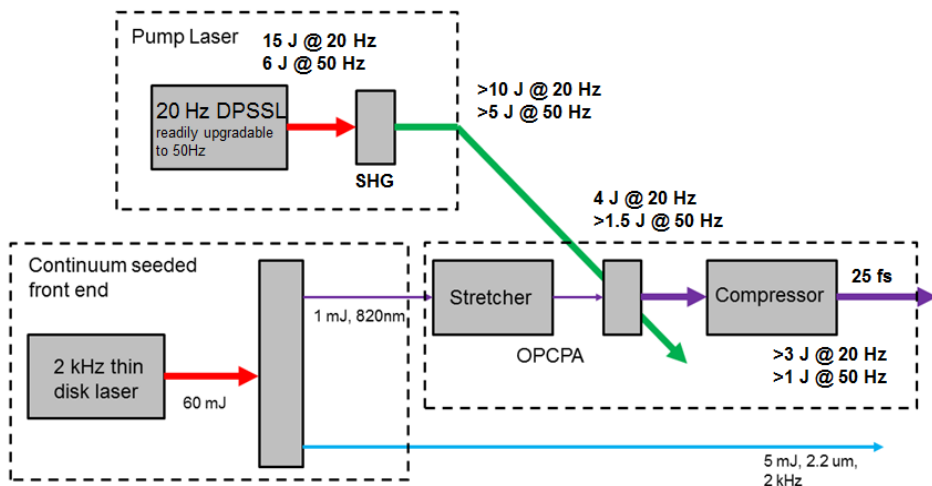
Picosecond OPCPA pumped by Yb:YAG thin-disk lasers
Inherently high temporal pulse contrast



System designed and built at ELI-Beamlines
(using commercial thin-disk pump lasers)

L2-DUHA: >100 TW system with mid-IR probe beam

High-rep rate laser system in construction, commissioning expected in Q1 2023



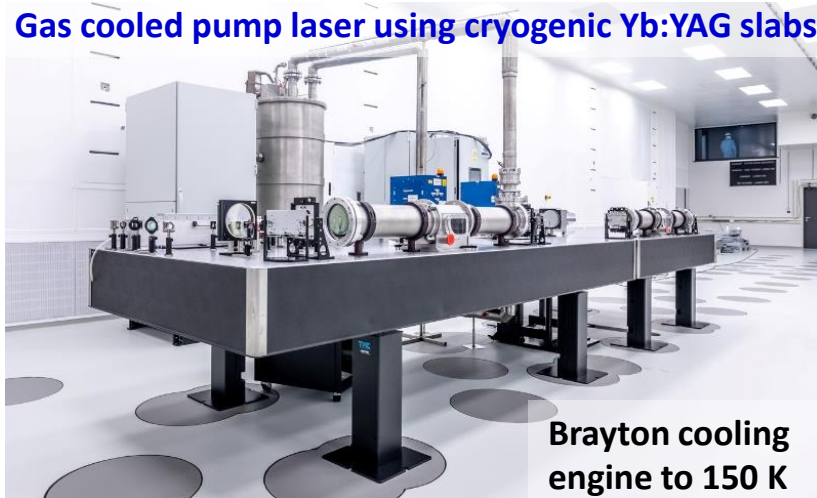
3 J / 25 fs / 20 Hz / 50 Hz @ 820 nm
5 mJ / 30 fs / 2 kHz @ 2.2 μm

Ns OPCA driven by Yb:YAG diode-pumped laser (15 J @ 1030 nm / 20 Hz)

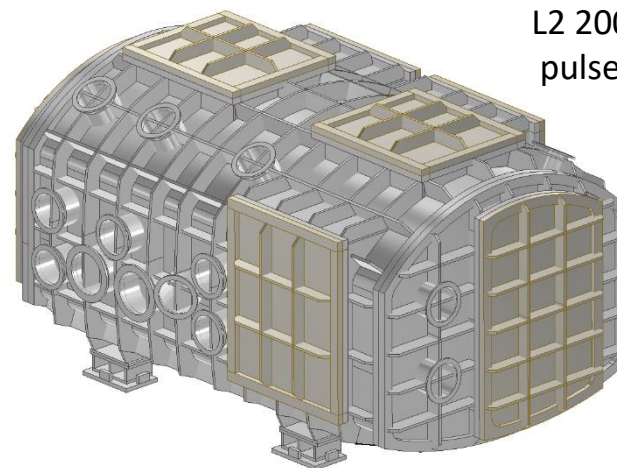
Thin disk ps laser driving supercontinuum in bulk YAG: seed for high-energy OPCA @ 820 nm & pump a DFG front end to generate 2.2 μm

Ready for upgrade to 50 Hz rep rate

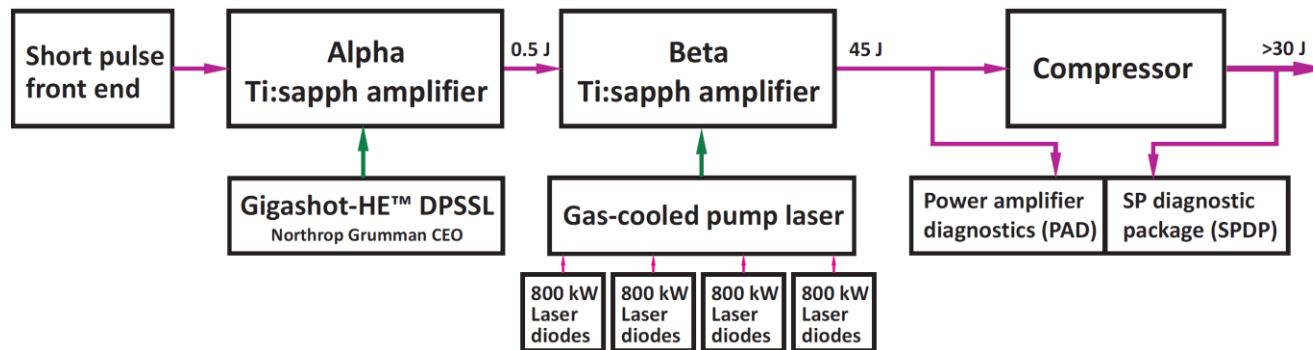
Gas cooled pump laser using cryogenic Yb:YAG slabs



L2 200TW pulse compressor



L3-HAPLS: High repetition rate Advanced Petawatt Laser System



1 PW (30 J /30 fs) 10 Hz repetition rate beamline

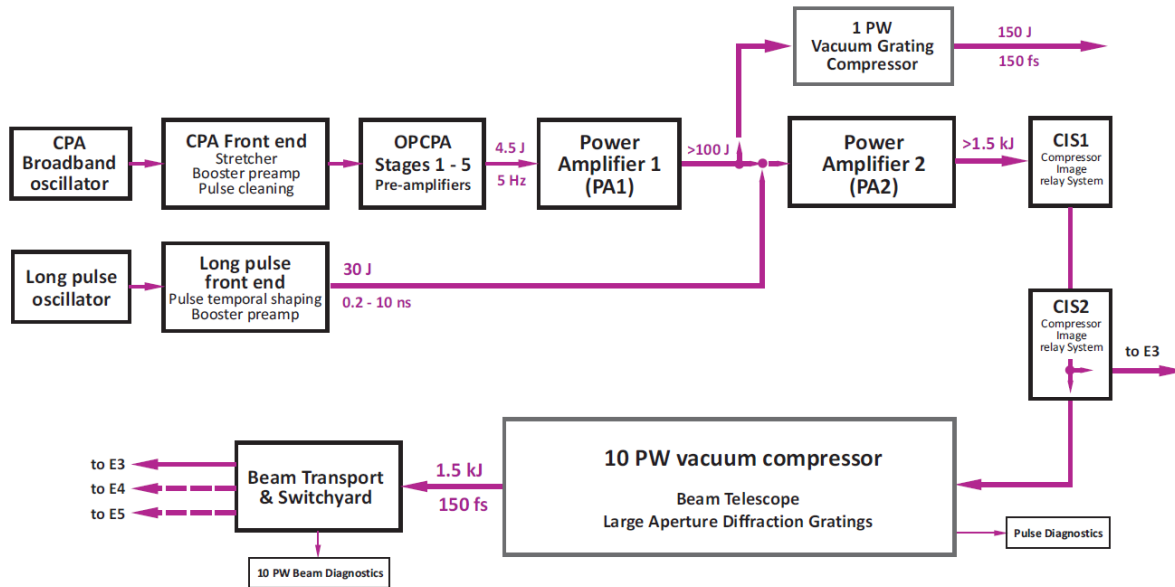
Ti:sapphire chain driven by gas-cooled diode-pumped laser

Developed by Lawrence Livermore National Laboratory (USA) with participation of ELI-Beamlines



Lawrence Livermore National Laboratory

L4: kJ CPA laser system to provide 10 PW peak power



Mixed Nd:glass providing spectral bandwidth >13 nm
Direct pulse compression to ≤ 150 fs

Advanced liquid cooling to ultimately achieve 1 shot /minute

Nanosecond kJ pulses with programmable temporal shape
Power amplifiers developed by National Energetics (USA)

