

# The Extreme Light Infrastructure ELI

## Europe on its way to build the world's first international laser user facility

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### **Abstract**

Roughly five decades after invention of the laser the international scientific community has joined forces to build the world's most powerful lasers for scientific research, the "Extreme Light Infrastructure" ELI.

Technically, ELI's high-power lasers will push the present frontiers in power, intensity and repetition rate by at least a factor of ten. Scientifically, due to the highly non-linear nature of ultra-intense light matter-interactions, a wealth of new research opportunities in basic science and applications arises. They include novel laser-plasma particle acceleration schemes, secondary radiation generation from THz to Gamma rays and their applications in science, life sciences and engineering, ultra-short radiation pulses in the atto-second regime, laser-based nuclear physics and nuclear photo-physics, up to pioneering exploration of QED effects in ultra-intense laser fields. ELI is presently being constructed as a distributed research infrastructure in the Czech Republic, Hungary and Romania, and will start operations in 2018.