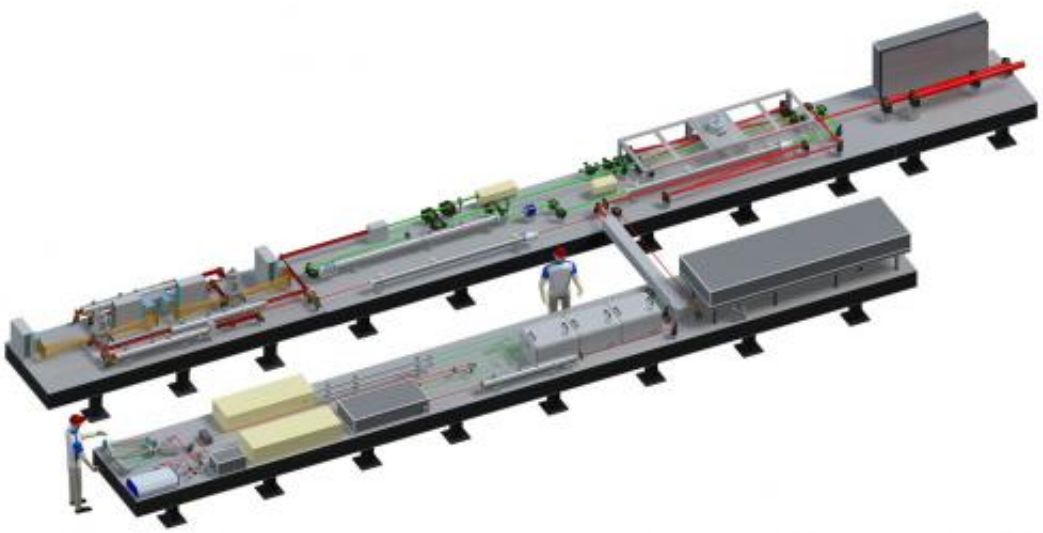
Lawrence Livermore to build super laser for ELI facility in Czech Republic

February 6 2014, by Bob Yirka



A CAD image of the ELI-HAPLS laser.

(Phys.org) —Representatives for Lawrence Livermore National Laboratory (LLNL) have announced that researchers and engineers there have been hard at work constructing a "High Repetition-Rate Advanced Petawatt Laser System" (HAPLS)—a laser unlike anything else ever built. The new laser once finished will be transported to Dolní Břežany near Prague, site of the European Union's Extreme Light Infrastructure (ELI) called ELI Beamlines

ELI Beamlines is a project similar to CERN, in that its development is the result of International cooperation and investment—though both

remain firmly European based. ELI Beamlines is to become for lasers what CERN has been for particle accelerators—a facility for the world's best scientists to conduct leading edge experiments—it will house some of the most powerful and advanced lasers ever built. Among that collection will be HAPLS, a laser that produces rapidly flickering (10 per second) beams, each just 30 femtoseconds in duration at 30 joules a shot—100 times more powerful than LLNL's most powerful laser to date—with peak power greater than 1 petawatt. In so doing it will be capable of generating secondary sources of radiation and speeding up charged particles. That will make it ideally suited for an enormous variety of research applications—from biology to physics and medicine—even to materials science. Scientists also envision a whole host of industrial research applications as well.

Scientists around the world are expected to be drawn to ELI Beamlines to use the lasers to test theories regarding the cosmos—to emulate what happens with pulsars, for example or to gain more understanding of how matter behaves inside of different stars—all possible because the energy from the short bursts of laser light will be on par with such massive energy producers, if only for a very short period of time. HAPLS is also considered as a possible blueprint for the construction of nuclear fusion facilities some time in the distant future.

ELI Beamlines is projected to come online in 2017 and to go into full operation the year after, offering scientists unprecedented access to extraordinarily powerful lasers—what they learn as a result could have far reaching implications well into the future.

More information: www.llnl.gov/news/newsreleases … 06.html#.UvN1OfldVfe