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PRESS RELEASE

The ELI-ALPS Research Institute celebrates turning to an operational RI

The first three laser systems, namely the mid-infrared, the Terahertz and the High Repetition Rate lasers are installed and becoming operational in the ELI-ALPS Research Institute in Szeged, Hungary. Already this year these systems will become available for use by the research community. Experimental campaigns using these systems are initiated in the framework of collaborations between ELI-ALPS and external scientists, fostering the dawn of the operational phase of the RI. With this opportunity ELI-ALPS organizes on November 9, 2017 its Grand Scientific Opening celebration. The amount of financial support for the second implementation phase of ELI-ALPS Research Institute is 40.052 billion HUF, 85% of which is provided by the European Union's Regional Development Fund.

The first laser systems have started shining in ELI-ALPS. The research institute's mid-infrared laser has been developed in a joint research and development project led by Fastlite, with the participation of ELI-ALPS colleagues for approximately EUR 1,6 million. This system has been successfully installed in ELI-ALPS and is the first to have passed the site acceptance test.
The so called high repetition-rate laser has been developed by a consortium of the University of Jena, the Fraunhofer Insitute and the Active Fiber Systems GmbH for approximately 3M€. The laser is now up and running, the final compression stages are under fine tuning. The site acceptance test is planned by 17th November.
The research and development tender for the design, implementation and startup of the Terahertz source was won by the University of Pécs in Hungary for EUR 2,74 million. Here the driver laser is already operating under full specs, while the THz source and spectroscopy devices are under the final adjustments. The acceptance test are planned by end November.

Regarding the technical novelity of the major laser sources, Károly Osvay, the research technology director of ELI-ALPS said, 'The now operational mid-infrared laser is unique as it provides energetic, few optical cycle laser pulses tuneable over a broad range of the mid-infrared regime. This system surpasses the current ones not only in peak power by a

factor of 3-5, but also in operational stability. The high repetition rate laser is unique also from its architecture and design. This is the very first research grade short pulse laser which is based on the well established diode and fiber laser technologies, combining it with the advanced methods of pulse shortening and phase stabilization. The result is a robust, yet table top laser system providing two optical cycle pulses at 100kHz repetition rate with a 24h long shot-to-shot stability.'

About the new scientific research opportunities opened up with the high repetition rate and mid-infrared lasers Dimitris Charalambidis, the chief scientific advisor of ELI-ALPS, said, 'These systems will serve as a driving source for novel short wavelength radiation sources of ultrashort pulses that will be dedicated to the investigarion of ultrafast electric charge dynamics in atoms, molecules, biomolecules, surfaces and nanomaterials. The mid-infrared source will be a special new device for physicists, chemists, biologists, biophysicists. Due to scaling laws of nature, mid-infrared lasers, as drivers of secondary radiation sources, permit the generation of coherent short wavelength radiation pulses reaching the so called "water window" spectral ragne. This is the soft x-ray region in which water is transparent and thus in this part of the electromagnetic spectrum the investigation of biological samples becomes possible. Moreover these scaling laws lead to high spead electrons the diffraction of which by the species they originate from allows for structural ivestigations of these species with Angström (1 Angström = 0.0000000001 meters) spatial resolution. In the beginning of 2018, scientific teams from the European Union are starting the first "commissioning" experiments on both lasers, in collaboration with a local team of researches and engineers.'

Today we start harvesting the results of a decade long continuus effort. ELI-ALPS is becoming operational at last and this is a good reason for celebrating. During the Grand Scientific Opening event organized today at ELI-ALPS, its status and the reseach oportinities opened are presented, while talks of destiguished European collaborators and users of the ELI-ALPS infrastructure are elaborating why ELI-ALPS is usefull, if not unique, for their research program and future plans.

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The main object of ELI-ALPS (Extreme Light Infrastructure Attosecond Light Pulse Source) project is creating a unique European research center, providing the international research community with laser pulses and further sources based on them. The Szeged facility will stand out from the institutes producing the highest intensity laser pulses in the world with its highest repetition rate and shortest pulses. This facility is expected to lead to reaching outstanding results not only in the field of ultrafast physical processes but also in biological, medical and materials sciences.

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