The ELI ALPS Laser Research Institute is a large-scale research facility established at the initiative of the international scientific community as part of the ELI project, primarily funded by the European Structural Funds and supported by national co-financing. Its state-of-the-art laser systems and the light and particle sources driven by them enable high-intensity light–matter interaction experiments. This unique research technology provides previously inaccessible experimental opportunities to study ultrafast processes, opening new fields of research in physics, chemistry, and materials science. The results of the fundamental research carried out here may have a significant impact on several areas of life sciences, and may also stimulate important photonic and technological developments.

To support the above objectives, we are announcing an application for the position of:

Research Fellow **(full-time position, 8 hours per day)**

The objective of the Ultrafast Sciences and Applications Division is to develop and provide state-of-the-art experimental endstations for femtosecond- and attosecond-resolution experiments in the solid, liquid, and gas phases. We conduct research to understand the fastest processes in various media, and we support the facility with background infrastructure, including advanced nanofabrication, chemical, and biological laboratories. The new colleague will be responsible for **designing, performing, and evaluating ultrafast transient absorption spectroscopy (TAS) measurements** to investigate photoinduced charge-carrier and exciton dynamics in advanced semiconductor, nanostructured, and hybrid material systems.

Description of the experimental setup:
The division's transient absorption spectroscopy (TAS) system enables the investigation of photoinduced processes with femtosecond time resolution. [1] The instrument is suitable for measuring various sample types, including solutions, thin films, and nanoparticle dispersions. It can be used to follow processes such as charge-carrier dynamics, exciton relaxation, the population and depopulation of trap states, and charge-transfer processes. [2–4] The system supports mechanistic interpretation through tunable pump and probe pulses, as well as intensity-dependent measurements. The setup is also suitable for polarization-dependent transient absorption measurements and transient absorption studies combined with electrochemical measurements. [5]

[1] ACS Energy Letters, 2024, 9 (6), 3187-3203
[2] The Journal of Physical Chemistry Letters, 2024, 15 (7), 2057-2065
[3] ACS nano, 2022, 16 (10), 16668-16676
[4] The Journal of Physical Chemistry C, 2024, 128 (9), 3815-3823
[5] Advanced Materials Interfaces, 2025, 12 (12), 2500159

Responsibilities of the new colleague:

- **Active participation in transient absorption spectroscopy (TAS) and related photophysical research** carried out in the division, with particular emphasis on the investigation of photoinduced charge-carrier dynamics, excitons, trap states, and charge-transfer processes.
- **Planning, performing, and evaluating ultrafast spectroscopic measurements**, including the investigation of processes occurring on femtosecond to nanosecond timescales in various semiconductor, molecular, nanostructured, or hybrid material systems.

- Independent and team-based implementation of TAS measurement campaigns: optical characterization of samples, optimization of excitation conditions, and performance of intensity-, wavelength-, and temperature-dependent measurements, as well as measurements combined with external perturbations.
- Processing, modelling, and interpretation of measured data, including kinetic fitting, global analysis, spectral fitting, lifetime analysis, and the development of models.
- Participation in the development of new measurement protocols, experimental setups, and data analysis methods, with particular emphasis on combining TAS with other techniques, such as electrochemical measurements.
- Documentation of scientific results and participation in the preparation of publications, conference presentations, research reports, and grant applications.
- Professional support of students, technicians, and early-career researchers, as well as participation in the development and maintenance of the division's research infrastructure.

Requirements:

- PhD degree in chemistry, physics, materials science, chemical engineering, or a related natural science/technical field.
- Experience in optical spectroscopy, photophysics, materials science, or nanoscience research.
- Confident command of English, particularly in reading scientific literature, writing publications, and international communication.
- Ability to independently design experiments and evaluate data.
- Precise, responsible, and well-documented work.
- Good problem-solving skills and openness to interdisciplinary research tasks.
- Ability to work both independently and as part of a team.

Advantages:

- Experience in transient absorption spectroscopy, ultrafast laser spectroscopy, or time-resolved optical methods.
- Experience in global analysis, kinetic modelling, spectral fitting, or the evaluation of multidimensional datasets.
- Experience with MATLAB, Python, Origin, Glotaran, Surface Xplorer, LabVIEW, or similar scientific data-processing / measurement-control software.
- Experience in the investigation of semiconductors, perovskites, nanoparticles, thin films, photocatalytic materials, or optoelectronic materials.
- Experience with complementary methods such as UV–Vis spectroscopy, photoluminescence, TCSPC, electrochemistry, Raman spectroscopy, or optoelectronic measurements.
- International publication experience and the ability to develop an independent research topic.

What we offer:

- The opportunity to participate in research connected to a unique ultrafast spectroscopic research infrastructure in Hungary.
- A modern, well-equipped optical and chemical laboratory environment.
- The opportunity to develop independent research directions in the fields of photoinduced processes, charge-carrier dynamics, materials science, and optoelectronics.

- Internationally relevant research topics, with opportunities for publications and conference participation.
- An interdisciplinary, youthful, and collaborative research environment.
- Competitive salary and benefits package.

Place of work: Szeged

Application procedure:
Applicants who are interested in the position and meet the requirements are kindly requested to upload their CV combined with a motivation letter to our career portal: https://www.eli-alps.hu/en/Career-1.