

Research Fellow position in the team working with the HR Gas beamline and the Reaction Microscope endstation of ELI ALPS

We are looking for an enthusiastic and skilled researcher with expertise in high-harmonic generation (HHG)/attosecond physics/atomic, molecular and optical (AMO) physics (or closely related disciplines) to participate in various projects carried out using the HR Gas beamline and the Reaction Microscope endstation of ELI ALPS. In addition to contributing to developing, upgrading and operating various pieces of equipment, the candidate is also expected to take part in user support during the use of beamlines and endstations in this permanent position.

Description of the HR Gas beamline and Reaction Microscope endstation

The HR Gas beamline is driven by the 100 kHz high average-power HR-1, or the 10 kHz HR-A lasers of ELI ALPS. The HR Gas beamline, which is designed for extreme ultraviolet – infrared (XUV–IR) pump–probe studies in gas phase and has been in use since June 2019 [1], is under continuous upgrade and has been user-ready since the beginning of 2021 [2]. The development of the beamlines to extend their capabilities is a permanent task of the involved team [3,4].

The team is also responsible for a Reaction Microscope (ReMi or COLTRIMS). Further endstations and detectors are planned to be installed and will be accessible for research as well as for projects initiated by the group [3,5].

[1] P. Ye et al., *J. Phys. B: At. Mol. Opt. Phys.* 53, 154004 (2020).

[2] P. Ye et al., *Ultrafast Science*, in press Article ID 9823783 (2022).

[3] L. Gulyás Oldal et al., *Phys. Rev. Applied* 16, L011001 (2021).

[4] M. Shirozhan et al. *Ultrafast Science* 4, 0067 (2024)

[5] T. Csizmadia et al., *New J. Phys.* 23, 123012 (2021).

What you will do:

The tasks of the Research Fellow to be hired include but are not limited to the following:

- Participating in the commissioning, maintenance and operation of various pieces of equipment for ultrafast physics studies in gas phase. These include the high-harmonic generation beamline HR Gas incorporating time-of-flight (TOF) and XUV flat-field spectrometers and a ReMi endstation, and further experimental apparatus to be installed.
- Provision of user support on the above mentioned research tools.
- Participating in the design, construction and assembly of additional group-managed equipment.



- The candidate will have the possibility to conduct own research as well, when beam time is available. Hence it is expected that the candidate has a vision of projects that could be implemented using the available infrastructure.

What we expect:

The candidate should hold a PhD in physics, chemistry or other related scientific field (applications of candidates on track to complete their PhD are also considered).

- Experience in HHG, attosecond physics, AMO physics or related research fields.
- Experience with ultrafast (femtosecond) lasers and ultrafast optics.
- Good technical knowledge in conducting time-resolved measurements, operating vacuum systems and characterizing ultrashort infrared or extreme ultraviolet pulses.
- The successful candidate is expected to have the ability to work both independently in the lab and as part of a team.
- Good written and oral communication skills in English.

Additional preferred qualifications:

- Good programming skills (Python, MATLAB, C++).
- Experience in 3D momentum imaging (e.g. ReMi/COLTRIMS or VMI) is an asset.
- Ability to lead a (research) project alone.
- Experience in projects where people from different disciplines (physics, engineering, IT) work together.

Job location: Hungary, Szeged

Start time: As soon as reasonable

Why join us?

- **International collaborations:** Our team frequently engages in international scientific collaborations with both experimental and theoretical areas, offering excellent opportunities to expand your global network and engage in pioneering research with experts in the field.
- **Cutting-edge facility:** ELI ALPS is part of the Extreme Light Infrastructure (ELI) project, providing access to some of the most advanced research tools in the world. ELI ALPS provides cutting-edge ultrashort light sources, including attosecond XUV and X-ray pulses, for the scientific community.
- **Quality of life:** We offer very competitive salaries in regional comparison, and the city of Szeged provides pleasant living conditions.



Apply now:

For further scientific elaboration and informal discussion on this positions please contact Dr. Subhendu Kahaly at subhendu.kahaly@eli-alps.hu and Dr. Tamás Csizmadia at tamas.csizmadia@eli-alps.hu with your cv and letter of motivation.

If you are interested in the position, please upload your CV (including a list of publications and at least two references) and motivation letter merged into a single PDF file to our Career Site at <https://www.eli-alps.hu/en/Career-1> .

Extreme Light Infrastructure ERIC / ALPS Facility / ELI-Beamlines

The Extreme Light Infrastructure (ELI ERIC) is the world's largest high-power laser research facility, offering cutting-edge lasers for groundbreaking science and innovation. Operating across two sites – ELI Beamlines in the Czech Republic (near Prague) and ELI ALPS in Hungary (Szeged) – it employs a diverse team of experts from around the globe.

ELI Beamlines operates four advanced femtosecond laser systems, delivering unmatched intensities. These lasers drive unique X-ray and particle sources for groundbreaking research in physics, chemistry, materials, life sciences, and astrophysics.

ELI ALPS operates lasers and secondary sources to deliver ultrafast light pulses (including attosecond pulses) for pioneering research in physics, chemistry, materials and life sciences. Its advanced systems enable exploration of ultrafast electron dynamics and complex molecular processes.