



Elettra Sincrotrone Trieste

# Postdoctoral Research Associate Position at the EIS-TIMEX Beamline

Deadline: 1 October 2024

Ref: DB/24/44

## Background

Elettra Sincrotrone Trieste is an international multidisciplinary research center operated as a user facility, featuring a 2.0/2.4 GeV, third-generation synchrotron light source (Elettra), a new free-electron laser light source (FERMI) and a variety of support laboratories. The extremely high quality of the machines and beamlines has set new performance records and has been producing results of great scientific and technological interest. In order to allow the laboratory to remain competitive in the next 20 years, an entirely new source - Elettra 2.0 - belonging to the new generation of storage rings (DLSR or Diffraction Limited Storage Ring) is being developed. The new source will exhibit a major increase in the brilliance and coherence fraction of the photon beams. The Elettra 2.0 optics is based on our enhanced symmetric six bend achromat structure (S6BA-E) with a 12-fold symmetry and an emittance of 200 pm-rad at 2.4 GeV. The new structure creates also straight sections in the arcs permitting the installation of additional insertion devices, thus increasing the number of beamlines. Existing beamlines will have to be upgraded and new beamlines developed to take full advantage of the characteristics of Elettra 2.0. The new machine is scheduled for commissioning in the second half of 2026. See <http://www.elettra.eu> for more information.

## Beamline/Activity/Project description

The EIS-TIMEX beamline is designed for time-resolved (< 100 fs) experiments on light-excited condensed matter by using the FERMI FEL in the 1.7-80 nm wavelength range and a Ti:Sa fs-laser (260-800nm) as synchronized and fully coherent sources for pump-probe experiments. Main research activities include the study of condensed matter under non-equilibrium conditions, both in high-energy density regimes and below the damage threshold, as well as nonlinear effects in materials (stimulated emission, absorption saturation, spectral broadening, sum frequency or second harmonic generation) in the extreme ultraviolet energy range.

Time-resolved transmission absorption spectroscopy in the extreme ultraviolet range is the main technique at the beamline. Scattering techniques and other time-resolved spectroscopies are also available, preferably in combination with the EUV spectrometer "WEST" positioned downstream of the experimental chamber. Pilot ultrafast electron diffraction experiments were successfully carried out using the FEL as a pump.

More recently, the beamline has been used for investigating the electronic ultrafast response of functional materials and chemical compounds exposed to sub-ps light pulses. Additional classes of novel experiments include activating and monitoring slow molecular vibrational modes through combined FEL and fs-laser pulses, as well as impulsive stimulated x-ray Raman scattering in materials. In November 2023, unprecedented amplified spontaneous emission experiments from high pressure gases were carried out using a novel experimental set-up

More information can be found on the following web page:

<https://www.elettra.eu/lightsources/fermi/fermi-beamlines/eis-timex/eis-timex.html>.

## Job description

The successful candidate will work closely with the coordinator and the staff of the beamline, as well as with the staff of FERMI, in order to achieve reliable and efficient user operation of EIS-TIMEX and to develop the instrument for addressing the needs of the user community. The postdoctoral research associate will have the opportunity to explore diverse scientific cases requiring sub-ps time resolution, including ultrafast charge transfer in molecules, conical intersections, molecular functionality, drug interactions, nanocatalysts, and photocatalysis. She/he will provide high-quality support to the external users of the beamline and develop her/his own research program contributing to the definition and execution of the in-house research activities and the dissemination of the results. She/he is expected to establish new research collaborations and to be involved in submitting proposals to suitable funding agencies.

### Elettra - Sincrotrone Trieste S.C.p.A.

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## Qualifications

A Ph.D. in Physics, Chemistry or a related discipline is required. The candidate must not have had more than 6-years of total postdoctoral experience, in academic institutions or private companies. Applications will be considered also from candidates who have completed a doctoral course of studies and for whom the defense has been scheduled. In any case, the Ph.D. must be awarded by the end of November 2024.

A background in experimental methods for FELs/synchrotrons or table-top lasers, supported by a publication record commensurate with career advancement, is required.

Any of the following qualifications will be considered as an additional asset (please, indicate relevant publications or thesis):

- Programming skills in Python or Matlab, including interfacing of instruments.
- Demonstrated ability in computational physics or data processing.
- Use and maintenance of high vacuum experimental set-ups.

The successful candidate should possess strong interpersonal skills favoring collaborative research programs in a team-oriented environment.

Good time management skills and ability to prioritize are expected, together with the ability to interact with the facility staff and international users at all levels, and to work as part of a multi-disciplinary team.

Good oral and written communication skills in English are essential.

## General information

The appointment will be a fixed-term employment contract of an initial duration of 12 months, extendable by agreement of both parties, in accordance with legal provisions in force, currently up to a maximum of 36 months. The salary will be commensurate with previous experience and qualifications of the candidate.

Applications should include the candidate's full curriculum vitae, the names and contact information (including electronic mail) of up to two persons who have agreed to provide references.

The interviews may be held via video conferencing.

The deadline for the submission of the application is October 1, 2024.

Permanent employees of Elettra Sincrotrone Trieste S.C.p.A. and employees or former employees of any Italian Public Entity who have exercised authority over Elettra Sincrotrone Trieste S.C.p.A. or have negotiated with Elettra - Sincrotrone Trieste S.C.p.A. within the last three years will be excluded from the present selection procedure, in accordance with the provisions of article 21 of the Italian legislative decree no. 39/2013 and in conjunction with article 53 (subsection 16ter) of Italian legislative decree no. 165/2001. We thank all applicants in advance.

For more information, please contact Emiliano Principi (email: [emiliano.principi@elettra.eu](mailto:emiliano.principi@elettra.eu)).

To apply for this position please visit the following link:

<https://www.elettra.trieste.it/it/about/careers/working-withus.html?id=4217>

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