Elettra Sincrotrone Trieste

Postdoctoral Research Associate at the Low Density Matter Beamline of FERMI

Deadline: 1 October 2025
Ref: DB/25/24

Background

Elettra Sincrotrone Trieste is an international multidisciplinary research center offering international users access to synchrotron and free-electron laser radiation for the characterization and processing of matter. The extremely high quality of the light sources 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 synchrotron radiation source - Elettra 2.0 - belonging to the new generation of storage rings (DLSR or Diffraction Limited Storage Ring) is being installed. The new source, based on our enhanced symmetric six bend achromat structure (S6BA-E) with 12-fold symmetry, will exhibit a major increase in the brilliance and coherence fraction of the photon beams. Existing beamlines are being upgraded and new beamlines constructed to take full advantage of the characteristics of the new source. Elettra 2.0 will enter service in the second half of 2026 and join the already operating free-electron laser (FEL) user facility FERMI. FERMI is currently unique in the international FEL panorama in exploiting external seeding to achieve unparallaledpulse stability, reproducibility and operational flexibility. See http://www.elettra.eu for more information.

Beamline/Activity/Project description

Our laboratory is committed to conducting outstanding research in diverse fields, among which atomic, molecular and optical science (AMO). The Low Density Matter (LDM) beamline at FERMI leverages the unique capabilities of the FEL source, including high brilliance and coherence, in conjunction with variable-focusing optics and a synchronized optical laser pump. These features enable time-resolved experiments with a resolution of tens of femtoseconds and, by an interferometric approach, the exploration of coherent electronic dynamics below 1 attosecond. The target systems encompass very dilute species, such as weakly-bound complexes, radicals, ions, as well as matter under extreme irradiation conditions (multiple excitation, non-linear optics). Experiments adopt a multi-technique approach that facilitates a thorough investigation of the electronic properties of free atoms, molecules, and clusters. See:

http://www.elettra.eu/elettra-beamlines/ldm.html for more information.

The LDM beamline staff has strong connections with the AMO research community worldwide (notably, it is a partner in the QU-ATTO Doctoral Network, see http://quatto.eu), and maintains a close synergy with Elettra's users community, particularly with researchers active at the Gas Phase beamline and its successor MOST (Molecular and Optical Science and Technology) beamline, which is currently under construction as part of the Elettra 2.0 project.

Job description

The postdoctoral position at the LDM beamline offers unique opportunities to researchers aiming to make high-impact contributions to one of the active research fields at the beamline, which include coherent control with shaped FEL pulses, molecular dynamics, and cluster science. The role requires a proactive approach to support users throughout every phase of their activity at the beamline, from preparing the experimental set-up to conducting complex data analysis and writing scientific manuscripts. The appointed candidate will be involved in one or more instrumental activities, which may include the development of new sample sources, the expansion of the optical laser set-up, and the optimization of existing spectrometers, while also contributing to the routine maintenance and operation of the beamline. In addition to operational tasks, the candidate is expected to actively participate in, and help shape, internal research, working closely with the LDM research team.

Qualifications

The position is open to candidates who already hold a PhD or are about to complete their PhD in physics, materials science, or a related discipline. In any case, the PhD must be obtained by the end of their first year of contract. Candidates who already hold a PhD must not have more than six years of total postdoctoral experience in academic

institutions or private companies.

A publication record in the field of Atomic and Molecular Physics commensurate with career advancement is expected, as is experience in at least one of the following techniques: time-resolved photoelectron spectroscopy, ion/electron imaging, short-wavelength laser spectroscopy.

The following qualifications will be considered as additional assets (please indicate relevant publications or thesis):

- Participation in experimental campaigns at synchrotron or FEL user facilities.
- Experience in ultrafast spectroscopy, including data analysis and interpretation.
- Programming skills in Python or Matlab.
- Familiarity with quantum chemistry computational methods.

The successful candidate should possess strong personal 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. 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 ranking of eligible candidates resulting from this selection procedure may be used for additional appointments within the following 24 months.

Employees or former employees of Elettra Sincrotrone Trieste S.C.p.A. or temporary and staff leasing employees or former employees with working experience at the company will be excluded from the present selection procedure. 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 also 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 (subsection16ter) of Italian legislative decree no. 165/2001.

The deadline for the submission of the application is October 1, 2025.

We thank all applicants in advance.
For more information, please contact Carlo Callegari (email: carlo.callegari@elettra.eu).

To apply for this position please visit the following link:
https://www.elettra.trieste.it/it/about/careers/working-withus.html?id=4262