Elettra Sincrotrone Trieste

# Postdoctoral Research Associate at TeraFERMI

Deadline: 15 March 2024
Ref: DB/24/4

## 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

Standing out among the FEL sources currently operating worldwide in the ultraviolet and soft x-ray range, FERMI exploits external seeding to deliver fully coherent ultrashort pulses (in the femtosecond range) with a peak brightness ten billion times higher than that provided by third-generation light sources and unique reproducibility of pulse wavelength, linewidth and intensity. FERMI presents unparalleled opportunities for investigating the structure and transient states of condensed matter, soft matter, and low-density matter through a variety of diffraction, scattering, spectroscopy and resonant excitation techniques.

The TeraFERMI beamline collects high brightness, coherent THz radiation emitted by the FERMI linear accelerator and guide it to a dedicated THz Laboratory. Ultrashort, single-cycle THz pulses with MV/cm electric fields and Tesla magnetic fields are available for experiments on a broad class of materials. These features permit TeraFERMI scientists to drive physical systems out of equilibrium, shaping the material properties in a desired manner. See http://www.elettra.eu/lightsources/fermi/fermi-eamlines/terafermi/terafermi.html for more information.

## Job description

The postdoctoral position at the TeraFERMI beamline offers a unique opportunity for researchers aiming to make impactful contributions to THz research. The successful candidate will work with advanced instrumentation based on ultra-fast laser technologies, and contribute to the development of novel experimental set-ups for multicolor pump-probe and single-shot THz spectroscopies. The role also demands a proactive approach to supporting users through every phase of their activity at the beamline, from preparing the experimental set-up to conducting complex data analysis and writing scientific manuscripts. The position will enable the postdoctoral researcher to shape and lead internal research projects in the emerging field of quantum materials with a particular emphasis on Dirac materials and other low-dimensional systems, seek research funding by actively participating in proposal writing, and fostering partnerships with external academic and research institutions. Mentoring students and nurturing their scientific development are also valued aspects of the role.

## Qualifications

A Ph.D. in Physics or related discipline is required. The candidate must not have 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 April 2024.

Previous experience in time-resolved pump-probe techniques and/or in THz spectroscopy, supported by a publication record commensurate with career advancement, is required.

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Proven skills and experience in the design, construction and commissioning of instrumentation relevant to synchrotron/FEL beamlines will be positively evaluated, as will be programming skills in Matlab, Python, or Labview software. Previous experience with electromagnetic simulation codes will be considered a plus.

The successful candidate should possess strong interpersonal skills favoring collaborative research programs in a team-oriented environment, have good time management skills and ability to prioritize, together with the ability to interact with the facility staff and international users. Good oral and written communication skills in English are essential.

## General information

The appointment will be a fixed term contract with an initial duration of 12 months. The salary will be commensurate with previous experience and qualifications of the candidate.

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

The deadline for the submission of the application is March 15, 2024.

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, 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.We thank all applicants in advance.
For more information, please contact Andrea Perucchi (email: andrea.perucchi@elettra.eu).

To apply for this position please visit the following link:
https://www.elettra.trieste.it/it/about/careers/working-withus.html?id=3761