



Elettra Sincrotrone Trieste

Postdoctoral Research Associate for Coherent Diffraction Imaging at Elettra

Deadline: 1 May 2023

Ref: DA/23/10

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

To take full advantage of the complementarity and modularity of soft/tender X-ray imaging techniques, a new Coherent Diffraction Imaging (CDI) beamline with multimodal capabilities in the energy range 350-4000 eV will be able to address a broad spectrum of scientific cases, materials and samples. This instrument will enable soft/tender X-ray scattering and imaging experiments in different modes and geometries; as such, it will represent a unique facility for coherent soft/tender X-ray science, with enhanced capabilities for Bragg ptychography, diffractive imaging, Fourier transform holography, scanning X-ray nanodiffraction and X-ray photon correlation spectroscopy.

The experimental station, currently under construction, is based on a fully in-UHV diffractometer. Inside the vacuum chamber a stable optical base will host the desired optics in suitable positions relative to the sample. Scanning nanopositioners will position pinholes and a complete focusing optics set-up (zone plate and order-sorting aperture) to focus or shape the beam at the sample position in the various configurations needed for the different techniques to be implemented. A liquid helium cooled sample manipulator will provide the low temperatures required to reduce radiation damage and entering the different regions of the phase diagram and investigate the structural and electronic phases of interest. High-efficiency, fast X-ray detectors (both pixelated and area-integrating) installed on the moveable diffraction arms will provide both time-domain access for the investigation of collective ordering dynamics as well as off-scattering plane angular capabilities.

Job description

The successful candidate will participate in the development and operation of the CDI beamline at Elettra 2.0. He/she will be involved in the construction of the new experimental station, conduct factory acceptance tests, participate in the installation of the experimental station on a branch line of an existing soft-X-ray beamline at the Elettra source and evaluate its overall performance, in collaboration with physicists and engineers of the optics, mechanics, vacuum, and detector laboratories and ICT staff.

In order to acquire high-level skills in coherent diffraction imaging with state-of-the-art soft x-ray scattering and imaging tools, the successful candidate will spend a working period of 12 months at the Coherent Soft X-ray Scattering (CSX) beamline of the NSLS-II synchrotron radiation facility at the Brookhaven National Laboratory (USA). See <https://www.bnl.gov/nsls2/beamlines/beamline.php?r=23-ID-1> for more information. For logistical reasons a driving license valid for the USA - such as an Italian driving license optionally accompanied by an international driving license - is required. After this initial training period, he/she will return at Elettra Sincrotrone Trieste to contribute to the development and commission the CDI beamline.

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 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 have been obtained for the employment contract to be signed.

A background in the following fields is required:

- ultra-high-vacuum methods and techniques for surface analysis, sample surface preparation, film and nanostructures growth
- strongly correlated electron systems and related physics

Proven experience in at least one of the following techniques is expected:

- X-ray absorption spectroscopy
- X-ray photoelectron spectroscopy/microscopy
- X-rays, electrons or neutrons scattering
- X-rays, electrons or neutrons diffraction

Experience in any of the following fields will be considered as an additional asset:

- experimental activities at large scale facilities, in particular synchrotrons
- X-ray detectors
- design, construction and commissioning of scientific equipment relevant to UHV systems or for synchrotron beamlines
- data collection, analysis and reduction
- programming skills in Igor Pro, Python and/or similar languages

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.

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

The appointment will be a fixed term contract with an initial duration of 36 months. The salary will be commensurate with previous experience and qualifications of the candidate. A relocation package for the initial training period in the USA and a related retention clause will be included in the hiring contract.

Due to the situation related to the COVID-19 virus, the interviews may be performed through video conferencing.

The deadline for the submission of the application is May 1, 2023.

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, 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

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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 Luca Gregoratti (email: luca.gregoratti@elettra.eu) or Silvano Lizzit (email: silvano.lizzit@elettra.eu).

To apply for this position please visit the following link:

<https://www.elettra.trieste.it/it/about/careers/working-withus.html?id=3085>

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