Elettra Sincrotrone Trieste

Junior Research Scientist for Coherent Diffraction Imaging at Elettra

Deadline: 2 May 2024
Ref: DA/24/18

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 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, plans are underway for the realization of a new Coherent Diffraction Imaging (CDI) beamline with multimodal capabilities in the energy range 350-4000 eV. The beamline and its experimental station have been designed to address a broad spectrum of scientific cases by performing soft/tender X-ray scattering and imaging experiments in different modes and geometries on a rich variety of samples; as such, it will represent a unique experimental facility worldwide, providing 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 UHV-compatible diffractometer. Within the vacuum chamber, a robust support platform will precisely position the optics, ensuring optimal alignment relative to the sample. Scanning nanoactuators will be used to position the pinholes and the set-up comprising the zone plate and order-sorting aperture. A liquid-helium cooled sample manipulator will enable access to the most intruguing phases of novel superconductros and electronic materials. The 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 be engaged in the development and operation of the CDI beamline at Elettra 2.0. Specifically, he/she will oversee all aspects of testing and commissioning of the new experimental station, from conducting factory acceptance tests to supervising its installation. This responsibility includes evaluating the overall performance of the experimental apparatus in collaboration with physicists and engineers of the optics, mechanics, vacuum gruop, detector laboratories and ICT staff. Moreover, the envisaged role requires a proactive approach to supporting the future users and collaborators of the CDI beamline through every phase of their activity, from preparing the experimental set-up to conducting complex data analysis and writing scientific manuscripts.

In order to gain high-level skills in coherent diffraction imaging with state-of-the-art soft x-ray scattering and imaging tools, the successful candidate will be required to 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 logistic 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.

Qualifications

A Ph.D. in Physics or related discipline is required. The candidate must not have more than 6 years of total postdoctoral experience, whether in academic institutions or private companies.

A solid background in magnetism (nano or ultra-fast) or in the field of strongly correlated electron systems is required, supported by a publication record commensurate with career advancement. Additionaly, proven experience in at least two of the following techniques is essential:

- Coherent diffraction imaging (CDI) at Synchrotrons or FEL sources
- Time-resolved methods based on a pump-probe approach.
- X-ray Absorption Spectroscopy / spectromicroscopy.

Proven skills in the development (i.e., design, construction and commissioning) of scientific instrumentation will be positively evaluated, as will programming skills (Matlab and Python), experience in data acquisition, analysis (e.g., LabVIEW, Origin, Igor Pro) or simulation software (e.g., micromagnetic simulations).

Knowledge of basic or advanced vacuum practice is desired. Previous activities at synchrotron radiation or FEL facilities will be highly considered. Experience in assisting users is considered a plus.

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 deadline for the submission of the application is May 2, 2024.

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 appointment will be a fixed term contract with a duration of 36 months in accordance with the National Metalworkers Collective Labour Agreement and the Company Agreement, ex. art. 8 of the Decree Law 138/2011, dated 28th March 2024.

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 may be included in the hiring contract.

The interviews may be held via video conferencing.

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 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=4041