

# Staff scientist for the SYRMEP Beamline at Elettra

Deadline: 9 August 2024

Ref: DA/24/33

## 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 SYRMEP beamline at Elettra is devoted to the application of advanced hard X-ray imaging techniques in biomedicine, biology and materials science.

The beamline set-up allows for the use of absorption and phase contrast techniques for microtomography studies in a wide range of resolutions, from a micron to several tens of microns according to sample size and the needed spatial resolution.

Dynamic microtomography scans are available for in-situ and in-operando studies under specific environmental and physical conditions (high temperature, controlled atmosphere, mechanical stress, etc.). Low-dose dynamic imaging protocols have been developed for pre-clinical research requiring in-vivo imaging on small animals.

In the framework of the Elettra 2.0 upgrade project, a new state-of-the-art hard X-ray imaging beamline, SYRMEP-LS, is under development. Optimised for life science (LS) applications, SYRMEP-LS will use a 6 T superconducting bending magnet as a photon source and will be equipped with several optical systems in order to exploit the source high brilliance and flux characteristics and deliver beams with a lateral dimension of tens of centimetres and energy bandwidths that can be modulated in the 10-130 keV range. Applications in diagnostic radiology will be the flagship programme of in-house research, but the wide angular acceptance will enable the study of large samples in a broad range of research fields. The high flux will allow the development of multiscale imaging protocols for applications in a wide range of resolutions, from sub-micron to some tens microns.

See <http://www.elettra.eu/elettra-beamlines/syrmep.html> for more information.

## Job description

The successful candidate will collaborate with the beamline staff in the commissioning of the new beamline, contributing to the design of the experimental set-up and to the definition of the control system and computing needs.

By exploiting the potential of the new beamline she/he will also play an important role in expanding the user community in the domain of X-ray imaging and the life sciences. The role involves an active collaboration with the beamline staff in all scientific activities and providing high-quality support to beamline users, from the experimental planning to the final data analysis.

In particular, the successful candidate will be responsible for scientific collaborations that necessitate multiscale phase contrast imaging studies in the life sciences, encompassing resolutions from sub-micron to the hundreds of microns range. This will include clinical and pre-clinical programmes. A set of standardised imaging and sample preparation protocols will be developed for the new beamline. This will encourage the use of multiscale CT set-ups by non-expert

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users and facilitate combined investigations with complementary approaches such as histology, AFM, FTIR, XRF, etc.

## Qualifications

PhD in Physics or related disciplines and at least 5 years of proven working experience at X-ray imaging beamlines with a suitable publication record are required.

Expertise in phase contrast imaging and X-ray multiscale tomography (micro and nano) is required, together with good knowledge in the use of phase retrieval approaches for applications in the Life Sciences.

Hands-on experience in the preparation of biological samples for multiscale CT scans, and for studies of virtual histology and of in-situ mechanical testing, is expected. Knowledge of 3D image visualization, processing and analysis tools such as Avizo, VGStudio and Fiji will be considered as useful assets.

Optimum time management skills and ability to prioritize tasks are expected, together with the ability to interact with staff and facility 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 envisioned is a permanent position in accordance with the National Metalworkers' Union Collective Labour Agreement and the Company Union Agreement dated 28th March 2024.

The salary will be commensurate with previous experience and qualifications of the candidate.

Applications should include a full curriculum vitae, together with the names and contact information (including electronic mail) of at least two, and possibly three references.

The interviews may be held via video conferencing.

The deadline for the submission of the application is August 9, 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 Giuliana Tromba (email: [giuliana.tromba@elettra.eu](mailto:giuliana.tromba@elettra.eu)).

To apply for this position please visit the following link:

<https://www.elettra.trieste.it/it/about/careers/working-withus.html?id=4206>