



Elettra Sincrotrone Trieste

# Postdoctoral Research Associate at IUVS beamline

Deadline: 3 July 2023

Ref: DA/23/18

## 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 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 IUVS beamline at Elettra is dedicated to the study of inelastic scattering with ultraviolet radiation, in a time-space domain not accessible at present by other facilities. In particular, the experimental set-up that enables to perform UV Resonance Raman (UVR) spectroscopy using synchrotron radiation (SR) in the range of wavelengths 200-270 nm provides a finely tunable source in the deep-UV for mapping a wide resonance landscape range in different samples, from nanostructures and strongly correlated materials to biophysical and biochemical systems. The research projects at the IUVS beamline include the characterization of dynamics of systems relevant in many scientific fields, including molecular liquids and water solutions, polymers and gels, biological macromolecules such as peptides, proteins and DNA and materials interesting for cultural heritage, catalysis and drug delivery.

In the framework of the Elettra 2.0 project, the scientific activities of the beamline will continue upgrading the IUVS beamline to a laser-based laboratory: IUVS 2.0. Specifically, the IUVS 2.0 upgrade will encompass the acquisition of new two tunable laser sources with emission in the deep UV range (DUV) region from 4 to 8 eV and of an optimized detection system to be used for UVR experiments. In the optical layout of IUVS 2.0, the DUV beam provided by the two laser sources will be collimated by two parallel series of optical elements (lens and high-reflectivity mirrors with specific coatings) optimized for the UV ranges 300-200 and 200-160 nm to the Raman analyzer system. Moreover, in order to investigate the widest range of sample materials, two options for the sampling method will be designed and developed, i.e., macro and micro configuration. The planned upgrade will lead to a higher photon flux and higher detection sensitivity, with a substantial reduction of the data collection time of UVR spectra, as well as the possibility to cover the whole range of outer electronic transitions up to 8 eV. This will enable the laboratory to further extend the number of users that currently operate on IUVS and enter a new scientific fields of research.

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

## Job description

The main activity of the postdoctoral fellow will be the design and implementation of the new experimental facility for UVR spectroscopy at IUVS 2.0. Additionally, the successful candidate will perform research in close collaboration with the beamline team, by exploiting the use of both SR and off-line sources available at IUVS, addressing mainly subjects related to the properties of molecular liquids, water mixtures and biological macromolecules, including proteins, DNA and pathogens. He/she will contribute to the operation, maintenance, and optimization of the IUVS beamline instrumentation, and will offer high-quality support to external users. He/she is expected to be involved in the preparation of proposals to suitable funding agencies and will be encouraged to establish his/her own research program using the available instrumentation during dedicated in-house research beamtime.

### Elettra - Sincrotrone Trieste S.C.p.A.

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## Qualifications

A Ph.D. in Physics, Photonics, Chemistry or a related discipline is required, together with very good skills in Raman and UV Resonance Raman scattering measurements and data analysis. Knowledge and experience in synchrotron radiation instrumentation and applications, especially for UV Resonance Raman spectroscopy, is also essential. A background in designing and building optical set-ups is desirable. A suitable publication record in the aforementioned scientific fields is expected. She/He should possess strong personal skills to pursue collaborative research programs in a team-oriented environment and to become part of existing research projects, besides to contribute to further extend the scientific collaborations of the beamline also through scientific dissemination activity. Good time management skills and ability to prioritize are expected, together with the ability to interact with staff and facility users at all levels and to work productively as part of a multi-disciplinary team. Good oral and written communication skills in English are essential. A working knowledge of the Italian language is desirable.

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 full curriculum vitae, contact information (including electronic mail) of at least three references.

The interviews may be held via video conferencing.

The deadline for the submission of the application is July 3, 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 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 Barbara Rossi (email: [barbara.rossi@elettra.eu](mailto:barbara.rossi@elettra.eu)).

To apply for this position please visit the following link:

<https://www.elettra.trieste.it/it/about/careers/working-withus.html?id=3241>

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