Computational scientist / engineer
for optimisation of phase retrieval x-ray imaging codes

A 12-month position is available at the Institut Fresnel in Marseille, France, an academic joint laboratory of Aix-Marseille University, CNRS and École Centrale.

We are developing digital microscopy approaches for visible light and x-ray sources (i.e., synchrotron) [1] applied to condensed matter and biological samples. These approaches are based on the use of numerical algorithms to retrieve 2D and 3D images of the sample from the information encoded in the measured diffraction signal.
In the framework of the LEAPS EasyBragg project, funded by the European Research Council, we have gathered an international team of collaborators from ESRF (France), MAX IV Laboratory (Sweden) and Diamond Light Source (UK) with the aim to implement a newly proposed approach called 3D Bragg ptychography at these synchrotron facilities, by deploying a user-friendly suite of analysis tools. This will open exciting perspectives for the x-ray and material scientist communities.

Position
We are looking for a computational scientist or engineer to optimise and translate the existing Matlab codes [2,3] into a user-friendly suite of analysis tools in Python to be deployed at synchrotrons. She/he will make sure that the new codes are compatible with the analysis tools, experimental setup and data format existing at the different facilities and will be in charge of implementing and testing them (or support the implementation and tests). Finally, she/he will be responsible for the preparation of the code documentation and take an active part in the writing of the article describing these new tools.
This offer combines the possibility of experiencing cutting-edge research at some of the top facilities in Europe, to work in close contact with an international team of experienced and motivated scientists and living in the south of France.

Requirements
The candidate must hold a master's or doctorate degree in science, with skills in physics and computer science. A documented significant contribution to the development of a scientific software is required. Extensive programming skills in Python are mandatory, notably for the implementation of optimisation and reconstruction algorithms. GPU programming (CUDA, OpenCL) is a plus. Previous experience in deploying data processing methods in an experimental physics project (astrophysics, particle physics, synchrotron science) is a major asset.

Terms of employment
The position is a 12-month full-time appointment under contract with the French National Centre for Scientific Research (CNRS), starting as soon as possible. Gross salary will depend on the experience of the employee, following CNRS rules. Typical net salary is about 30 000 euros for 12 months. Some flexibility in the working conditions is possible, depending on the specific situation of the candidate and after agreement with the hosting teams.

Application
Candidates are requested to submit:

- a detailed CV
- evidence of previous experience in producing codes
- 2 references full name and e-mail address

to virginie.chamard@fresnel.fr;

Selection will be based on merit and potential, measured in terms of the academic records and personal achievements. Creativity, proactivity, and inclination for teamwork will be considered as strong assets. Good level of spoken and written English is expected.

References
[1] www.fresnel.fr/comix
[2] P. Godard *et al.*, Nature Communications (2011), 10.1038/ncomms1569
[3] S. Hruskewycz *et al.*, Nature Materials (2017), 10.1038/nmat4798

Contact project Principal Investigator for further information
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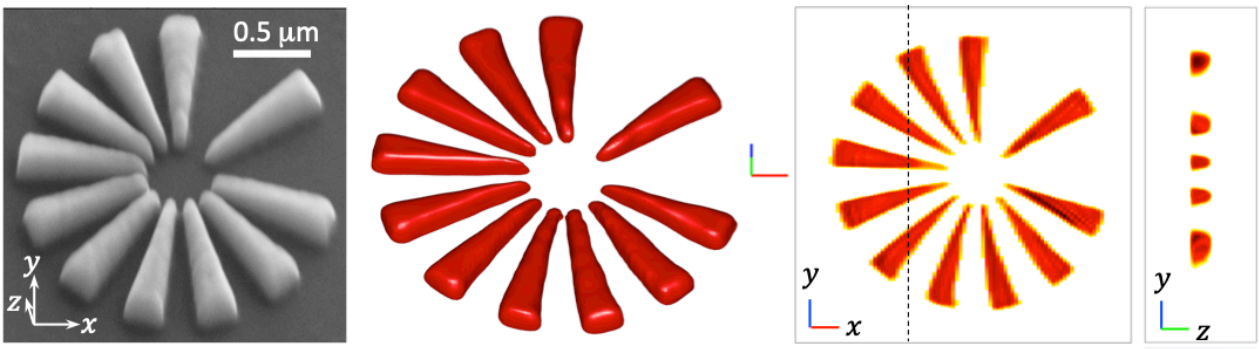

Figure: (left) Scanning electron microscopy image of a 3D test pattern. (middle) 3D reconstruction of the same pattern using Bragg ptychography at the MAXIV synchrotron source and (right) its associated 2D cross sections. The high quality of the reconstruction results from improved phase retrieval codes, which will be implemented at various synchrotrons during the project. Figure adapted from [Li et al., Light: Science et Applications (2022)].