

# Université Claude Bernard Lyon 1- Hosting offer for a MSCA Post-doctoral fellowship candidate in micro-processing for photonics

<b>Host Organisation</b>	<b>Université Claude Bernard Lyon 1</b>
<b>Department</b>	<b>Physics</b>
<b>Laboratory</b>	<b>Institute Light Matter</b>
<b>Website (lab / research team)</b>	<a href="https://ilm.univ-lyon1.fr">https://ilm.univ-lyon1.fr</a>
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## Host Organisation

The Université Claude Bernard Lyon 1 welcomes Marie Skłodowska Curie Postdoctoral Fellowships applications !

With 62 laboratories and more than 7000 publications per year, and leading French university in terms of the number of patents filed in collaboration with industry, Lyon 1 contributes to scientific and innovation progress in numerous fields: health, mathematics, IT, physics, chemistry, earth and space sciences, life sciences, etc. Creator of emerging knowledge and new technologies, the University is consolidating its research excellence on a global and international level by developing inter- and multidisciplinary approaches targeting the major challenges facing today society.

## Host research lab/team

The Laboratories Institute Light Matter (ILM) is a leading research lab in Europe in advanced materials and optics. It is a joint research unit of the CNRS and Université Claude Bernard Lyon 1, located on the LyonTech-La Doua campus. With a staff of 310 members, including approximately one third PhD students and postdoctoral researchers, iLM is a center of excellence in physics and chemistry in the Auvergne-Rhône-Alpes region and enjoys international recognition for the quality of its research. The scientific activities of iLM are organized around six main thematic areas: advanced materials and optics, complex matter and out-of-equilibrium systems, nanosciences optics, dilute media, and ultrafast processes, living systems, health, and environment.

The MNP (Material Nano-structures Photonics) research team is a specialist in photonics nanostructures including thin film for optic, plasmonic, chiral structure and optics for art and Hheritage.

## Hosting Offer

The MNP team at ILM lab offers to host a MSCA Postdoctoral Fellowship candidate (typically a post-doc of less than 8 years research experience since PhD defence), submitting an application to the next MSCA-2026-PF call for proposals (deadline 09<sup>th</sup> of September 2026), interested to work on the following research topic.

In the frame of a collaboration between the ILM in Lyon, the Astrophysics Laboratory of Marseille (LAM) and the Lyon Institute of Nanotechnology (INL), a 2 years post-doc position is envisioned through the COLALA Project (CONvex surfACE grating deveLOpment for Astronomy). This collaborative project aims at developing an innovative technological solution for manufacturing high efficiency blazed gratings on convex surfaces for advanced next-generation space instruments.

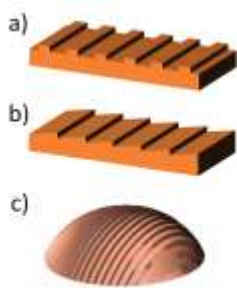


Figure 1 Blazed grating on convex surface

New generations of instruments for observing the universe require breakthrough technological components. For instance, the “BATMAN” spectro-imager, developed at the Laboratory Astrophysics Marseille (LAM), is based on a MOEMS-based digital micro-mirror and a convex grating to disperse light, but the performance could be improved using blazed gratings [1]. Indeed, the low efficiency per order obtained with usual gratings (Figure 1-a) can be improved using blazed gratings (Figure 1-b), but this requires technological development to make them on a convex surface (Figure 1-c). This grating is thus a key component for reaching unprecedented performance with this spectro-imager.

In this project, the researcher will develop the technological process for writing first a grayscale 1D structure on flat surface according to a Graphic Design System (GDS) design file edited using python programming and laser lithography (Figure 2-a). In order to qualify the technological results, morphological characterizations will be performed using Atomic Force Microscopy (AFM) and optical profilometer (Figure 2-b). Back-and-forth comparisons between the fabricated devices and the lithography design will enable to adjust grating in terms of geometry: periodicity, height, blaze angle, roughness... After this initial study to adjust the resin parameters to meet the requirements of the blazed grating implemented on a flat surface (Figure 2-c), the researcher will develop a process for writing grayscale structure on a convex surface. As the lithography system allows an automatic focus adjustment, the GDS designs to reproduce the array on a convex substrate will be re-implemented. The fellowship could last for 12 to 36 months, depending on the type of Postdoctoral Fellowship.

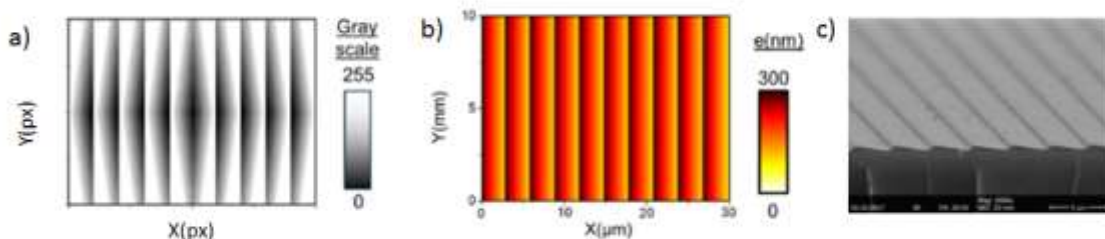


Figure 2 : Example for a) Greyscale GDS file for lithography ; b) Modeling of the obtained micro-structure after lithography by taking into account the surface morphology and c) fabricated microstructure on a flat surface [1]

## Supervision

The successful Marie-Curie Post-doctoral fellow will be supervised by Alban Gassenq from ILM, Nicolas Terrier from INL and Frederic Zamkotsian from LAM. Her research interests include Micro-processing, optical grating fabrication [2-4] and astronomic applications [1].

## References

- [1] F. Zamkotsian et al. "convex blazed gratings for high throughput spectrographs in space missions" Inter. Conf. on Space Optics 2023, Proc.127772]
- [2] A. Gassenq et al. "Selective grating obtained by dye micro-structuration using a laser writer" Appl. Opt. 2020 59, 5697
- [3] A Gassenq, et al. "Diffraction grating enhanced photoluminescence from etching-free erbium thin films" Opt Lett. 2023, 1:48(11)
- [4] Nguyen Ha My Dang et al. "Nanoimprinted exciton-polaritons metasurfaces: cost-effective, large-scale, high homogeneity, and room temperature operation" Optical Materials Express 2024, 1:14(6)

## Application process

Interested candidates are invited to contact us exclusively by email at [alban.gassenq@univ-lyon1.fr](mailto:alban.gassenq@univ-lyon1.fr). Make sure that you include the reference to this offer in the title of your email. Please attach a CV, a motivation letter, your MSc marks, as well as a 1 page research proposal. Candidates with experiences in micro-processing and cleanroom works will be appreciated.

## Professional grant application support

Candidates will receive the support of the supervisors, as well as online training from a professional grant application company, and advices from successful applicants, to prepare and submit their application with the ILM as a host laboratory, to the next MSCA-PF call for proposals.