



Master in Photonics – “PHOTONICS BCN” Master ERASMUS Mundus “EuroPhotonics”

MASTER THESIS PROPOSAL

Starting full time from April 2024

Presentation at the end of July or beginning of September 2024

Laboratory: Optical Design and Assembly

Institution: ASE Optics Europe

City, Country: El Prat de Llobregat, Spain

Title of the master thesis: Development of a dimensional metrology diagnostic for the lithium target of the IFMIF-DONES facility

Name of the master thesis supervisor and co-supervisor: Thomas Siegel

(for external proposals a co-supervisor from the Master program and a collaboration agreement is needed)

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Keywords:

Optical metrology, lidar, optical design, optical laboratory, laser

Summary of the subject (maximum 1 page):

The IFMIF-DONES facility currently being built in Granada, Spain, will use the interaction of a high-velocity liquid lithium jet with deuterons accelerated to MeV energies to generate a high flux of neutrons. Paramount to the efficient generation of neutrons is a fine control of the liquid lithium jet thickness. ASE optics is developing a dimensional metrology system able to monitor the thickness of the liquid lithium jet live during the facility operation. The measurement will be performed optically through a purpose-built amplitude modulated Lidar.

Objectives:

The project will yield an amplitude modulated Lidar system enabling the characterisation of a fast-flowing liquid metal surface. The project will combine optical design through Zemax, together with the implementation, optimisation, and characterisation of the physical Lidar setup in ASE Optics' laboratories. The custom Lidar system, based on amplitude modulated light phase detection, shall yield surface reconstruction accuracy better than 0.1mm at a working distance greater than 8m. The selected candidates will be integrated in ASE Optics' team of engineers and actively contribute to the development of the dimensional metrology system. The publication of the results either as conference proceedings or in a peer-reviewed journal are foreseen as part of the work at ASE.



Additional information (if needed):

* Required skills:

- The candidates shall be familiar with optical laboratory alignment and optics handling techniques.
- The candidates shall be familiar with practical parametric optimisation of system components.
- The candidates shall have experience in data analysis and presentation of results
- The candidates shall be fluent in either Spanish or English

* Desired skills:

- Experience in optical design and the use of optical design software (Zemax) would be a plus
- Experience in programming either for hardware control or automated data analysis

* Miscellaneous:

- The candidates are expected to demonstrate their ability to work as part of a multi-disciplinary team with physicists, optical engineers, electrical engineers, mechanical engineers and laboratory technicians.
- The candidates will be expected to demonstrate critical thinking and problem-solving skills.
- All work will be performed at ASE's premises. www.aseoptics.com