

Master internship position (M2)

Internship location: Institut de Physique de Nice (INPHYNI)
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<https://inphyni.univ-cotedazur.eu/sites/wacs>

Salary: ~ 600 €/months

PhD thesis possibility after internship: **YES** (Funding under review)

Scattering characterization of a white glass

Context Since humans first made glass 4,000 years ago, colour has been a defining property of this material. Many objects of cultural heritage and everyday life are coloured by nanoparticles (NPs) in glass. Their eye-catching aesthetic is provided by the combination of colour and transparency. The most significant socio-economic advances in glass production have occurred over the past four decades with the advent of nanostructured surfaces. Meanwhile, recent studies of the most colourful biological and geological objects suggest that their intense colour, despite their small thickness, originates from a delicate interplay between light absorption and scattering by micrometric and nanostructures.

Objectives Drawing inspiration from these sophisticated natural nanomaterials, the project aims to create intensely coloured objects based on glass with embedded nanoparticles. To achieve this, we propose an original approach based on phase separation. The first goal is to experimentally control the nanostructuration by phase separation and characterise it optically. We already have glasses synthesised at CE-MEF using phase separation, and the objective of the initial stage of the project is to characterise them optically.



Alumino-Silicate glass:
the white color is due to
phase separation.

Work program The optical characterization will be done using a speckle correlation technique¹. By changing the wavelength of the probe laser, the speckle in transmission decorrelates more or less depending on the scattering mean free path, i.e. the average distance between scattering events. The student will realize the optical setup, perform the optical measurements, and correlate the results with electron microscopy results of the glasses.

Supervision and environment Hosted at INPHYNI (Université Côte d'Azur, Nice), the intern will work in collaboration with the Fibre Optics and Applications group for the physics of glass part, and the Waves in Complex Systems group for the scattering characterization part. The internship will combine training in the physics of phase separation, and optical characterization, offering the student a solid introduction to material science and scattering techniques.

Profile We are looking for candidates who are highly motivated to conduct research and have a keen interest in material sciences and fundamental physics, particularly in the field of photonics.

¹G. J. Aubry, N. Fuchs, S. Skipetrov, and F. Scheffold. *Opt. Lett.* **47**, 1439 (2022).