REWARD: A PHD STUDENT FOR A PHD IN PHYSICAL CHEMISTRY

TO BE FILLED FOR SEPTEMBER 2021!

« Reconfigurable Soft Acoustic Materials: toward tunable flat acoustic lens »

Funding: University of Bordeaux scholarship, Laureate of the 2021 Interdisciplinary call for projects.

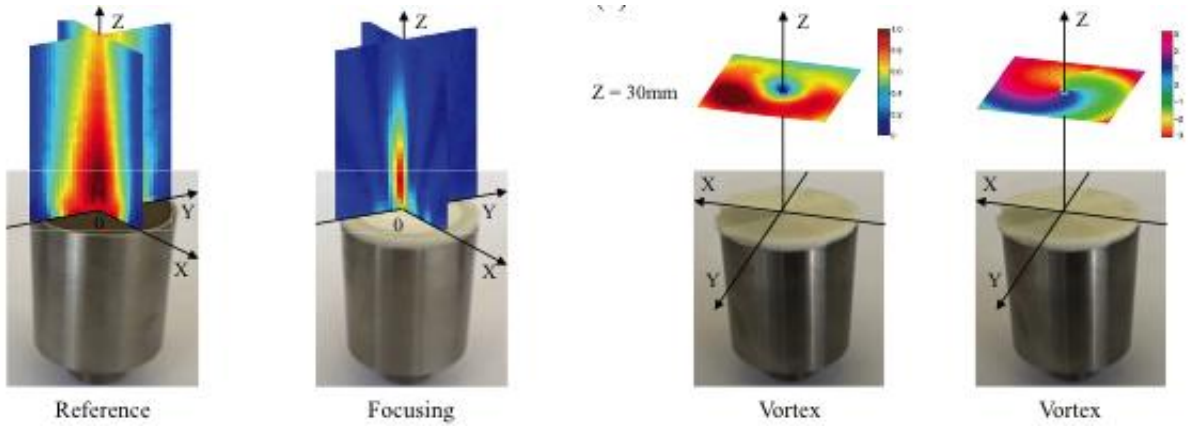
Location: University of Bordeaux, Centre de Recherche Paul Pascal and Institute of Mechanics and Engineering

Candidates should send their CV and get in touch as soon as possible with Olivier Mondain-Monval (olivier.mondain@crpp.cnrs.fr) and Thomas Brunet (thomas.brunet@u-bordeaux.fr).

Profile sought: Master in chemistry, materials chemistry or in physical chemistry. The student should have a strong taste for multidisciplinary subjects.

This project concerns the development of new reconfigurable, self-healing and / or recyclable materials for acoustics. The general idea is to give a material acoustic functions that can be modified through the application of an external stimulus and thus ensure its versatility. The materials targeted by this project are flat acoustic lenses that come in the form of ultra-thin films (also called "acoustic metasurfaces") with properties that can be reprogrammed via illumination by UV radiation of specific wavelength.

This proposed project is based on the expertise gained on the Bordeaux campus concerning “soft” porous polymer materials (that is to say with a glass transition temperature much lower than ambient) which exhibit extremely low speeds of sound. We were thus able to produce the first flat and ultra-thin acoustic lenses for 3D ultrasound focusing or vortex generation (see figure below). Although effective, the acoustic devices produced have the disadvantage of having fixed properties such as given focal lengths and so on. We now want to go much further by adding functions within the material that allow the lens properties to be tuned at will through the application of a simple light stimulus.



Pictures of flat lenses deposited on ultrasonic transducers along with their effects on an acoustic field. From Jin, Y., Kumar, R., Poncelet, O., Mondain-Monval, O. & Brunet, T, *Nature Comm.* **10**, 143 (2019).

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