PhD offer

Multifunctional Acoustic Metasurfaces

Hosting University and Lab**: University of Lorraine – CNRS, Institut Jean Lamour – France**
Supervisor **:** Badreddine ASSOUAR (Badreddine.Assouar@univ-lorraine.fr).

Subject:

We are seeking for a brilliant PhD candidate to start a PhD project on Acoustic metamaterials/metasurfaces for low-frequency applications to start by October 2018. Our group in the "Institut Jean Lamour", Institution belonging to the University of Lorraine and CNRS, develops since many years different research topics related to acoustic/elastic metamaterials and metasurfaces both on theoretical and experimental aspects. This has led to some majors achievements in the field of metamaterials [1-4]. The challenge of low-frequency acoustic absorption and elastic wave mitigation based on lightweight thin meta-structures has been one of the most exiting one we have faced, and with which we aim to cope in this proposed PhD project.

In this PhD thesis project we propose to theoretically develop and experimentally demonstrate the concept of a multifunctional thin metamaterial/metasurface for both low-frequency absorption (below 100 Hz) and acoustic energy harvesting. We, indeed, would like to develop a transformative approach by which we can implement the multi-functionality aspect into a thin meta-structure. To achieve this goal, numerical and theoretical platforms will be established in the first part of the PhD project as a first foundation. The latter will then bring the project to the experimental track including the conception/design, fabrication and experimental analysis of the multifunctional metasurfaces.

To lead this project with its different aspects, we are seeking for a brilliant PhD candidate who has a strong background in at least two of these fields: physical acoustics, waves, applied

physics, materials physics, … She/he should have very good English writing and communication skills. Some fundamental bases in computing and experimental work will be a plus.

The hosting institution is the Institut Jean Lamour (University of Lorraine and CNRS), one of the largest institutions in France. The candidate will work in the "Metas group" led by B. Assouar. The group has very recently moved to a new campus with new and advanced facilities and equipment, given a great opportunity to both students and faculties to benefit from a very rich, comfortable and exciting research environment.

References

1. J-H. Oh, S. Qi, Y-Y. Kim & M. B. Assouar. Phys. Rev. Applied, 8 (2017) 054034.

2. S. Qi, Y. Li & M. B. Assouar. Phys. Rev. Applied, 7 (2017) 054006. Highlighted by PhysicsBuzz and PhysicsCentral.

3. Y. Li & M. B. Assouar. Appl. Phys. Lett., 108 (2016) 063502. Highlighted by AIP, Phys.org, ScienceDaily, ... Among most read APL papers in 2016 and 2017 and a ESI highly cited paper.

4. Y. Li & M. B. Assouar. Scientific Reports, 5 (2015) 17612.

Candidate profile

- Master degree in one of these specialties: acoustics, applied physics, material physics, waves, mechanical engineering …
- For the Master students who are interested, **please send me your CV, a motivation letter and your marks for the Master**.
- Benefit: 1400€ net/month + health insurance.
- **Deadline of application: April 15, 2018**. Thesis to start by October 2018.