



Aquitaine –Karnataka collaboration
Scientific Project for Pre-PhD student exchange
Scientific Proposal

Project Title	Synthesis of acoustic metamaterials using emulsion templating and microfluidics	
Scientific domain	Physical-Chemistry	
Summary (ca. 10 lines)	Metamaterials constitute a new class of artificial materials in which electromagnetic or acoustic waves do not propagate in a conventional ways. Such extraordinary propagation properties are promising in a large numbers of applications including imaging, cloaking, filtering and focusing devices with until now unattained performances in terms of resolution and/or attenuation properties. We recently synthesized the first 3D fluid acoustic metamaterial [1] by dispersing soft porous polymer beads in a fluid matrix. These objects were synthesized using a combination of an emulsion/polymerization-templating procedure and a microfluidic process. The aim of the proposed subject is now to improve the system and the corresponding materials performances. The subject will include a formulation/processing part along with an acoustic part regarding the characterization of the materials in collaboration with an acoustic lab located on the same campus.	
Student profile wished	Physical chemist, with a particular taste for interdisciplinary project at the physics-chemistry interface	
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Timing & duration for project (give approximate ranges)	A first step would last 4 to 6 months and could be followed by a PhD thesis (3 years)	
Representative References	[1] T. Brunet, A. Merlin, B. Mascaro, K. Zimny, J. Leng, O. Poncelet, C. Aristégui, and O. Mondain-Monval, to appear in <i>Nature Materials</i>	

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