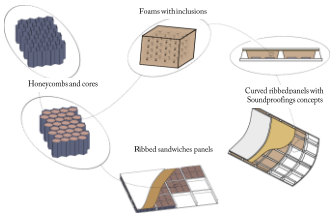
Invitation to participate
1st VIPER Winter School
« Wave propagation in periodic media »

6-8 February 2017
Amphi 203
Ecole Centrale de Lyon

LECTURES ON
Dynamic and wave propagation in periodic media: methodologies and applications

Scope



A typical structural configuration for vibration and sound attenuation treatments used in different cases is shown here. The construction has a multi-layer periodic topology. A critical topic for academics and R&D industrialists involved in vibroacoustics is the understanding of the periodicity effects on the broadband vibroacoustic performance. A point worth of mentioning is the presence of different periodicity scales. The level of interaction between the different scales of periodicity may lead to the creation of more efficient mechanisms to control the vibroacoustic macroscopic behaviour of the structure. *The modeling and the understanding of these meso-macro cross-linked mechanisms are the focus of the first VIPER winter school.*

The aim of this winter school is to present a state of the art of these periodic structures design tools. During three days, lectures will be given by world specialists of this field of research. The fundamental basis of these periodic media, their interest and their limitations will be presented. The winter school is open to audience of Master and PhD students, engineers and researchers interested in numerical modelling in vibroacoustics of periodic media.

Speakers :

Prof. Massimo Ruzzene
Professor - Georgia Institute of Technology, USA
Expertise : Vibration and Wave Propagation

Prof. Sergey Sorokin
Professor – Aalborg Univeristy, DK
Expertise : Wave propagation/Vibroacoustics

Dr. Claude Boutin
Senior Scientist – ENTPE, FR
Expertise : Homogenisation/Multi-scale methods

Dr. Abdelkrim Khelif
CNRS Senior Scientist – FEMTO-ST, FR
Expertise : Acoustic metamaterials and photonic crystals

Dr. Sébastien Guenneau
CNRS Senior Scientist – Fresnel Institute, FR
Expertise : Wave propagation, Photonics

Dr. Dimitrios Chronopoulos
A. Professor – Nothingham University, UK
Expertise : Structural dynamics/vibroacoustics

PARTICIPATION

Participations from both the academia and the industry are welcome. Maximum number is **50**.
Registration fees : **150** euros, including coffee breaks, lunchs and course supports.
Full program available on: http://viper.ec-lyon.fr/ Deadline for registration : **27th January 2017**

CONTACTS

To participate or to have more informations about this event, please contact : zsoka.bori@ec-lyon.fr

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VIPER
VIbroacouctics of PERiodic Media

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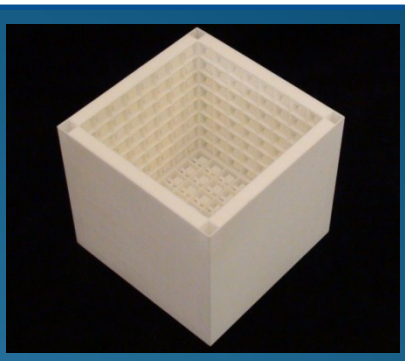

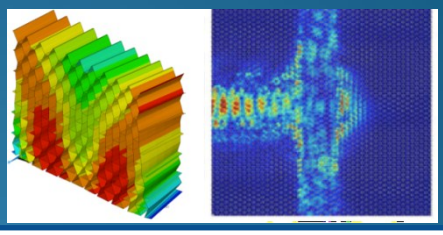

VIPER is a European Joint Doctorate on Vibroacoustics. VIPER aims at consolidating academic research dealing with VIbroacoustics of PERiodic media. Structural periodic design is a powerful strategy for lightweight structures achievements while remaining a convenient solution for manufacturing guidelines aspects. Including vibroacoustic design rules at early stage of products development is one of the main research targets. Periodic media exhibit proper dynamic filtering effects that can be smartly used for vibroacoustic design. The question addressed then is simple: how periodic concepts can improve the broadband vibroacoustic signatures and performances? Most of vibroacoustic treatments are frequency band limited. Indeed, on the one hand, viscoelastic materials (for instance) can be used for low frequency passive vibration control. On the other hand, poroelastic blankets are efficient for high and mid frequency absorption of acoustic disturbance. Newly and extensively employed lightweight structures present a strong dynamical overlapping between low, mid and high frequency bands that needs to be dealt with.

The VIPER project' main goal is to develop and to validate tools for the design of global vibroacoustic treatments based on periodic patterns allowing passive control of vibration and acoustic paths in layered concepts. This will be achieved by addressing in-depth structural periodicity stiffness as well as absorption attributes. The proposed concepts would ensure a significant improvement of vibroacoustic performances in a wide frequency range. Dealing with large scale periodic structural-acoustic concepts involves a multi-scale aspect that needs specific numerical tools. A two scale strategy will be pursued in most of the achievements to handle periodicity effects: the meso-scale is related to the elementary cell or the span, while the macroscale relates to the full-size structure. Each scale will be characterized by its own efficiency indicators: effective parameters (mechanical and acoustical equivalent material properties, dispersion characteristics…) at the meso-scale, and vibroacoustic indicators (structural damping, acoustic absorption, transmission loss…) at the macro-scale.

KU LEUVEN · ÉCOLE CENTRALE LYON · UFC UNIVERSITÉ DE FRANCHE-COMTÉ · University of BRISTOL · UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

European Commission

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