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Séminaire SPP

Lundi 9 novembre 11h00

CEA-Saclay Bât 141, salle André Berthelot

Time-reversed waves : from acoustics to electromagnetism

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ESPCI

Time-reversal invariance is a very powerful concept in physics. In the field of acoustics where time reversal invariance also occurs, time-reversal experiments may be achieved simply with arrays of transmit-receive transducers, allowing an incident wave field to be sampled, recorded, time-reversed and re-emitted.
Time Reversal Mirrors (TRMs) refocus an incident wave field to the position of the original source regardless of the complexity of the propagation medium. TRMs have now been implemented in a variety of physical scenarios from GHz Microwaves to MHz Ultrasonics and to hundreds of Hz in ocean acoustics.
Common to this broad range of scales is a remarkable robustness exemplified by observations at all scales that the more complex the medium (random or chaotic), the sharper the focus. A TRM acts as an antenna that uses complex environments to appear wider than it is, resulting for a broadband pulse, in a refocusing quality that does not depend of the TRM aperture.
TRMs open the way to new signal processing that interest imaging, detection, source localisation, telecommunications and therapy. Time reversal mirrors have plenty of applications including medical ultrasound, non-destructive testing, home automation, telecommunications, underwater acoustics, seismology, sound control. An overview of these fields will be presented.

Le café sera servi 10 minutes avant.

NB : La présentation d'une pièce d'identité est exigée à l'entrée du centre. Tous les auditeurs extérieurs sont priés de prévenir à l'avance Emilie Chancrin, tél. 01 69 08 23 50, e-mail : `emilie.chancrin@cea.fr`. (U.E. : délai de 24 h, hors U.E. : délai de 4 jours).