

Master Lumi 2017 – presentation October 27, 2016

Light waves in complex media: from biological tissues to cold atoms

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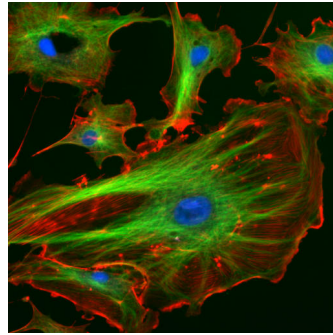
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ONDES ET IMAGES

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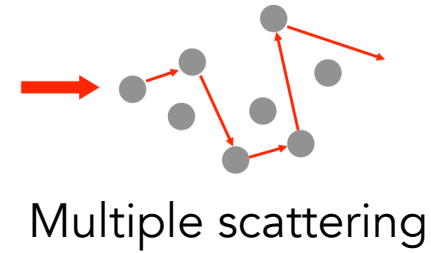
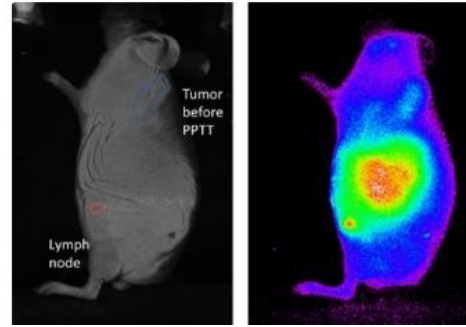
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The challenge of "seeing through scattering media"

In vitro

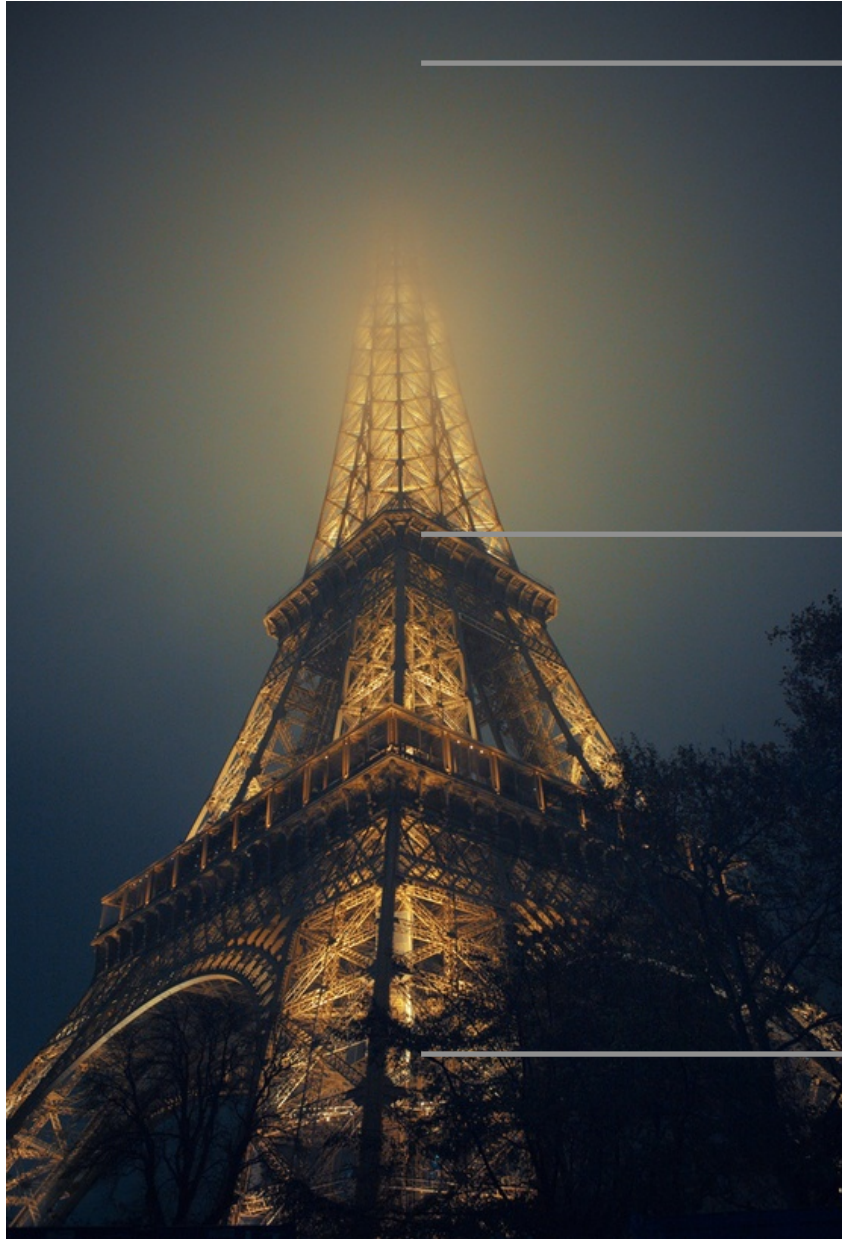


In vivo



- (1) How can we describe wave propagation in complex environments ?
- (2) What are the strategies to counter the effect of disorder ?
- (3) How to take advantage of the degrees of freedom of complex systems to achieve new functionalities ?

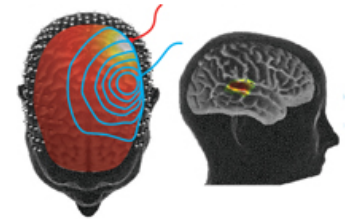
Transport regimes and imaging modalities



Multiple scattering



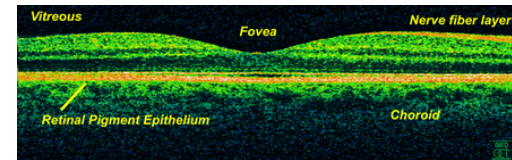
Opt. diffuse tomography



Single scattering



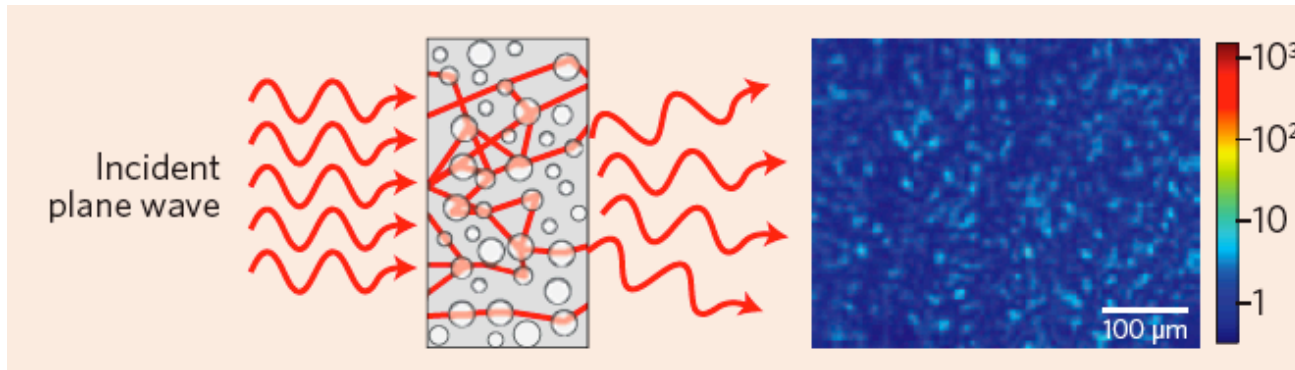
Opt. coherence tomography



Ballistic propagation

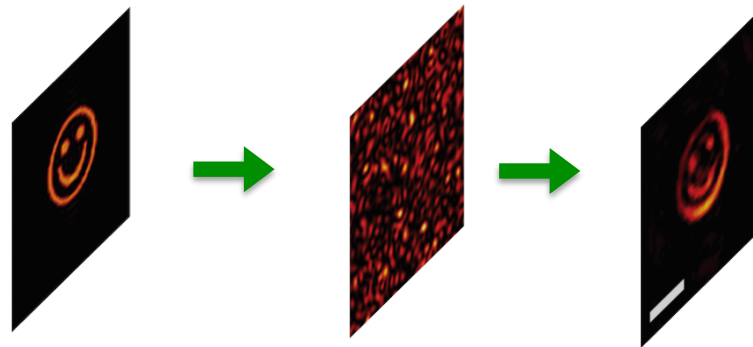


Coherent effects and imaging modalities



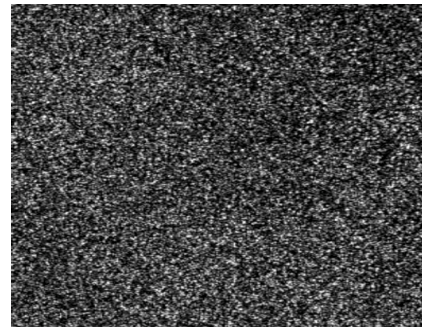
Speckle

How to recover an object hidden behind an opaque medium from the speckle ?



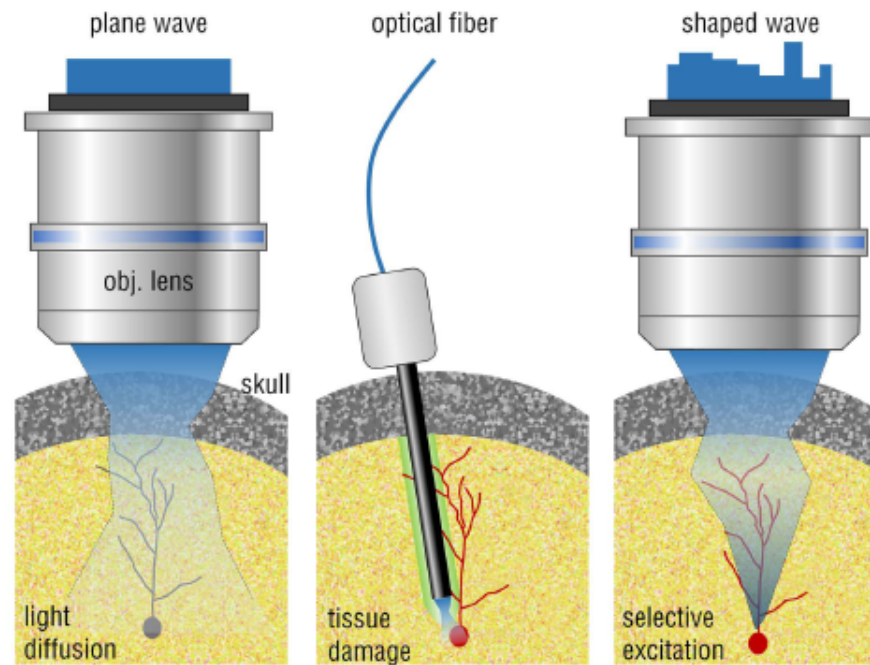
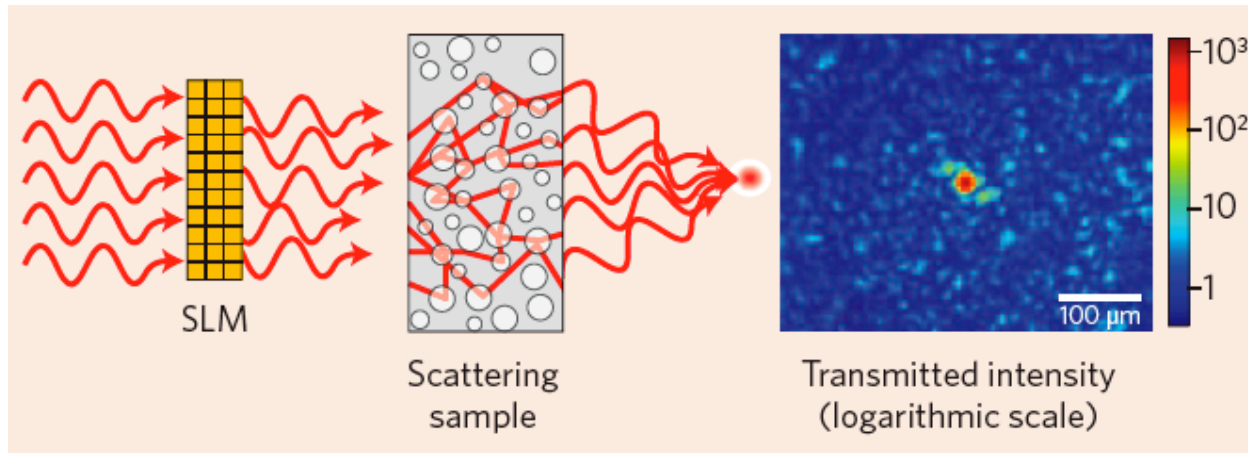
Memory effect imaging

Diffusing wave spectroscopy (functional imaging)



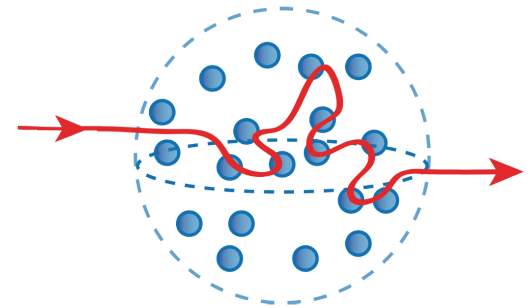
Access to dynamic properties of the medium

Wavefront shaping: an ongoing revolution !

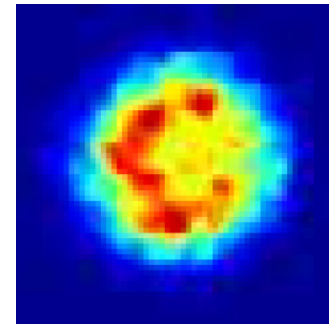


Light and cold atomic gases

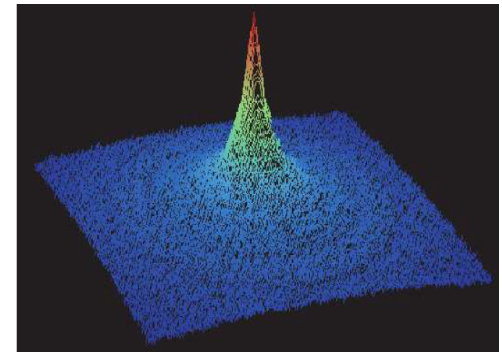
Radiation trapping due to resonant atoms



Flash effect in temporal transmission



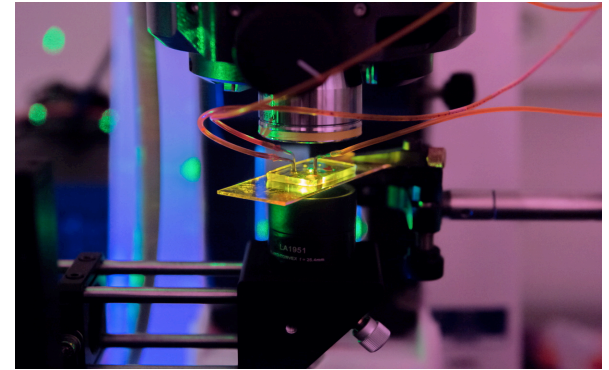
Wave localization and coherent backscattering



Organization

Schedule

28 hours of lectures with 4 tutorials
Friday afternoon, January-February
Laboratory visit (optional)



Exam

Oral

Location

UPMC, Paris



Language

English or french