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Imaging tissue and wavefront control: application to
acousto-optics and photoacoustics

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Although optical waves do not exhibit the same ability to be manipulated as e.g. electromagnetic waves up to a few GHz or acoustic waves, for which field emitters-detectors are available, various tools are nevertheless available in the optical domain which open the path to tricks which can be used in the context of sound-light detection. In the purely optical domain, one knows the impact of deformable mirrors led to adaptive optics which is now coupled to OCT for retinal examination. Real time holography leads to complex wavefront synthesis and are useful in acousto-optics (AO) to monitor very complex speckle field distributions. Phase conjugation which is in certain conditions equivalent to time reversal, starts to be used for wavefront retrieval after propagation in turbid media, one can think to use it for AO signal monitoring; moreover matrices of spatial light modulators allow to control light not only spatially but also in the frequency domain and open the field to new astonishing experiments. We will discuss a few applications and perspectives offered by these new devices to the field of biomedical imaging.