RECONSTRUCTION OF MONO AND BI-DIMENSIONAL IMAGES IN FOURIER-TRANSFORM ACOUSTO-OPTIC IMAGING

New method for performing acousto-optical imaging based on a spatio-temporal structuring of acoustic plane waves.

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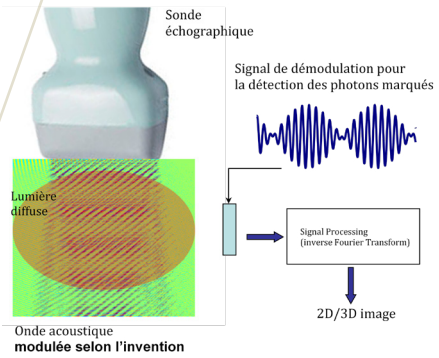
PRESENTATION

Medical imaging is in constant search for innovation to improve the quality of images and therefore the reliability of medical diagnoses. Acoustic imaging offers greater resolution and improved contrast. Limits are still slowing down the development of this technology, particularly the intensity of ultrasonic waves or the limits of the observable area.
The proposed technology makes it possible to respond to these problems by implementing a new method of plane wave imaging. The idea is to modulate the carrier wave, namely the aforementioned plane wave, by a periodic signal.



Acousto-Optical Imaging - Plane wave - Fourier imaging
Synchronous detection - Modulation

COMPETITIVE ADVANTAGES

- Extension of the observable area thanks to the to the use of non-focused acoustic waves
- Limit of ultrasound intensity in accordance with biomedical standards

APPLICATIONS

Coupling with other medical imaging methods such as:

- A multi-element ultrasound probe
- A high power monochromatic laser
- An acousto-optical signal measurement system

DEVELOPMENT PHASE

A bench prototype has been developed, work is being carried out for an in vivo prototype.

INTELLECTUAL PROPERTY

Extension number PCT : WO2020011944

PUBLICATIONS

K. Barjean, K. Contreras, J.-B. Laudereau, É. Tinet, D. Ettori, F. Ramaz, and J.-M. Tualle, Fourier transform acousto-optic imaging with a custom-designed CMOS smart-pixels array, Optics Letters 40 (5) 705-708 (2015)

Maïmouna Bocoum, Jean-Luc Gennisson, Alexander A. Grabar, François Ramaz, and Jean-Michel Tualle, Reconstruction of bi-dimensional images in Fourier-transform acousto-optic imaging, Optics Letters 45(17) 4855-4858 (2020)

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