LENSFREE

"Lensless" imaging

Thanks to its extra large field of vision and compactness, Carnot CEA LETI's lensless imager enables healthcare professionals to perform analyses at the patient's bedside rather than in a lab. The technology is also at least ten times cheaper than an optical microscope and is capable of analysing 10 000 biological objects at the same time. This innovation is protected by 25 different patents.

Carnot CEA LETI

Scientific / technological breakthrough

The light emitted by near-infrared LED lighting is diffracted by the biological object being analysed and produces a holographic pattern which is recorded by a CMOS image sensor. Holography reconstruction algorithms are used to reconstitute a screen image.
Image processing software using artificial intelligence can then detect, analyse and even classify the biological objects observed using specific indicators. These operations are automated and independent of an operator.

The competitive advantage for the economic stakeholders

These new compact, portable, low-cost and automated laboratories will be used by specialist consultants in hospitals and general practitioners as well as by nurses and carers in retirement homes or during home visits. Bedside diagnosis will make it possible to administer the appropriate treatment much faster.

Development perspectives:

- Miniaturisation and development of a self-test kit for patients
- 3D microscope technology for in vitro diagnosis and drug screening: spatial organisation of cells, cell migration, imaging of complex objects (embryos or organs on-chip).
- Pairing with microfluidics for organ-on-a-chip imaging

Contact
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