

# Random Laser based sensor



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**PATENT STATUS:** Granted

**PRIORITY NUMBER:** 102016000054453

**PUBLICATION:** 30 January 2019

**PUBLISHED AS:** EP; IT; WO

## Invention

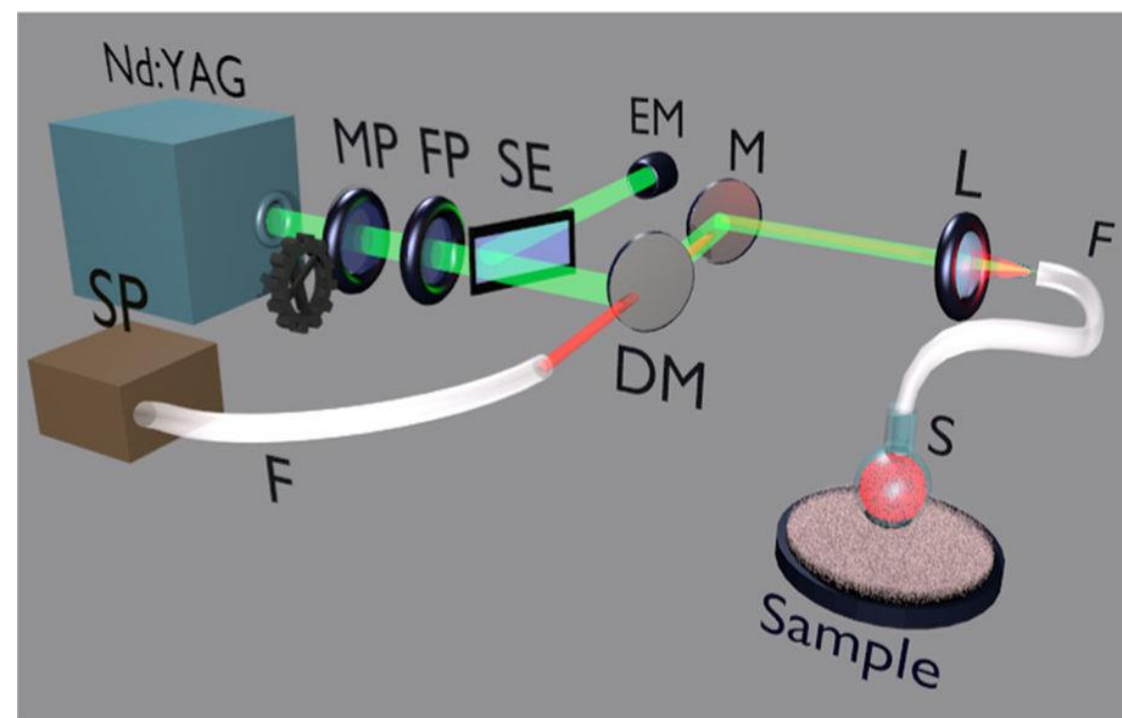
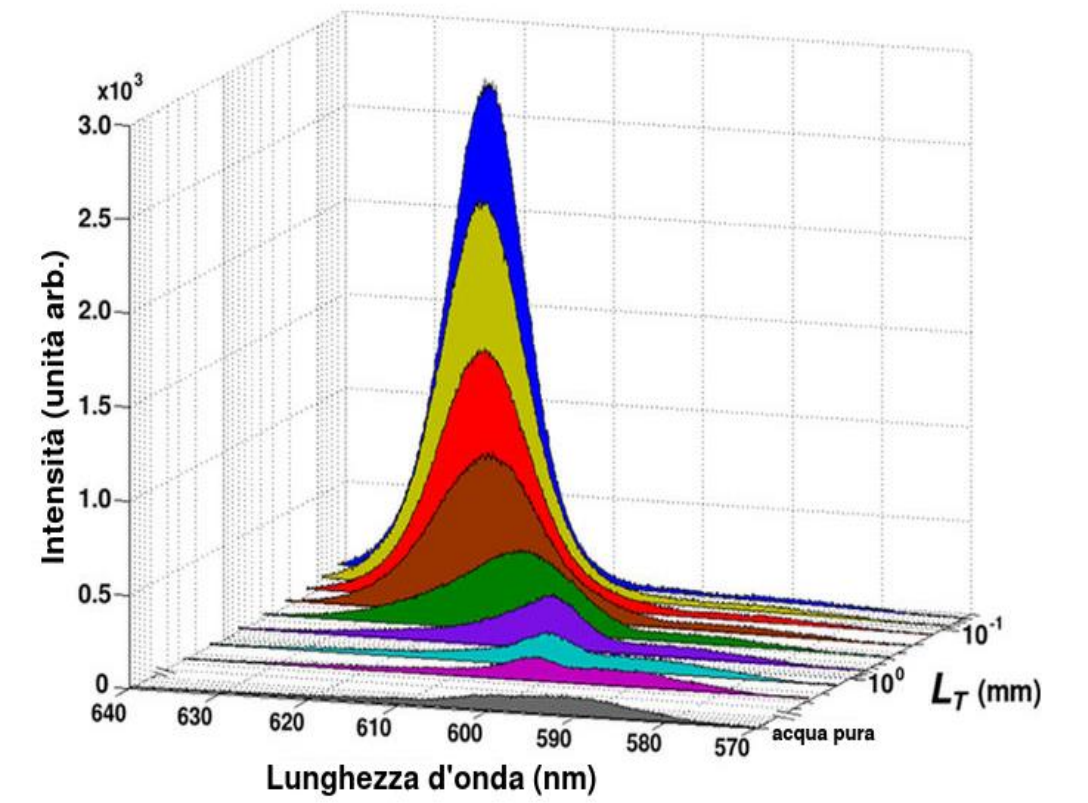
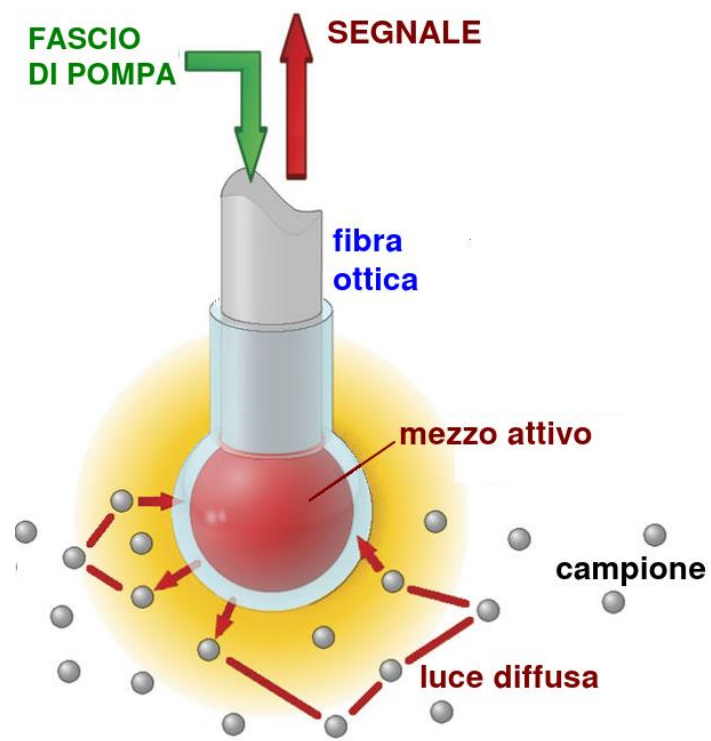


The invention consists of an optical sensor based on the random laser phenomenon, for the characterization of materials capable of diffusing light, such as powders, biological tissues, liquid dispersions and diffusive surfaces. The sensor has an extremely low invasiveness and a high sensitivity guaranteed by the phenomenon of amplification of diffused light.

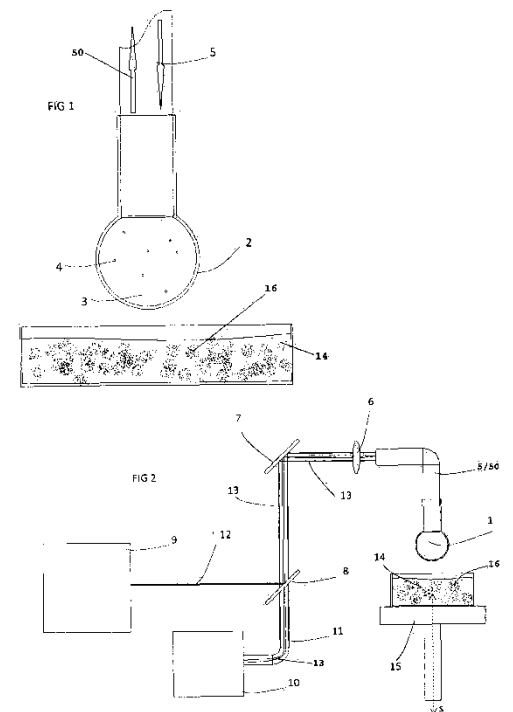
This optical sensor, coupled with fiber and based on the random laser phenomenon, allows the characterization of various types of materials: substances capable of diffusing light, powders, biological tissues, liquid dispersions and diffusive surfaces.

With this device it is possible to quickly and non-invasively determine the reduced scattering coefficient (the inverse of the mean free transport path) of the sample, deducing it from the emission spectral characteristics of the random laser. High sensitivity is guaranteed by the phenomenon of light amplification, typical of the stimulated emission mechanism, applied to diffused light. It is possible to perform local measurements and in difficult environments thanks to the great portability obtained with fiber coupling and the fact that the sensor itself acts both as an emitter and as a signal receiver.

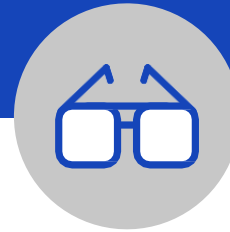
# Drawings & pictures



WO 2017/203351 1/1 PCT/IB2017/06635



## Industrial applications



The invention can find application in all those sectors in which it is essential to proceed with the characterization of diffusive materials, such as carrying out in vivo measurements on biological tissues, as well as some quality control tests.

The advantages ensured by the patented technology consist in the total absence of invasiveness and the high sensitivity of the sensor, capable of carrying out direct measurements of optical characteristics: the patent in fact exploits the amplification of the signal given by the stimulated emission of the random laser.

The sensor also stands out for its easy portability and simplicity of use, making it an effective and extremely adaptable tool for the study of very different materials.

## Possible developments



The patent is available for an exclusive and non-exclusive license, as well as for definitive assignments. The licenses are available for the entire remaining term of the patent titles.

The research group is available for new research activities in collaboration and on behalf of third parties, technical insights, scientific advice, also aimed at raising the TRL of technology.

The TRL of the invention is 3/4.

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