

dCAM: direct Confocal Absorption Microscopy

New three-dimensional imaging microscopy process without fluorescence dyes

Invention

Dyeing a microscopic non-fluorescence object with fluorescence dyes is to date the only procedure for spatial visualization with conventional fluorescence laser scanning microscopes (LSM). In contrast, dCAM is the first system which does not require additional fluorescent dyes for spatial visualization. It directly uses the object's self-absorption. Additionally this process achieves a higher resolution in comparison to conventional fluorescence LSM.

Principle

For the first time dCAM uses the pump-probe method, established in spectroscopy, for three-dimensional imaging.

A focused exciting laser beam of a specific wavelength (pump laser) changes the transmission of a microscopic sample. This is detected via a second Laser (probe laser) through the same focus and evaluated electronically. The system detects the change of transmission, depending on the excitation intensity and absorber concentration.

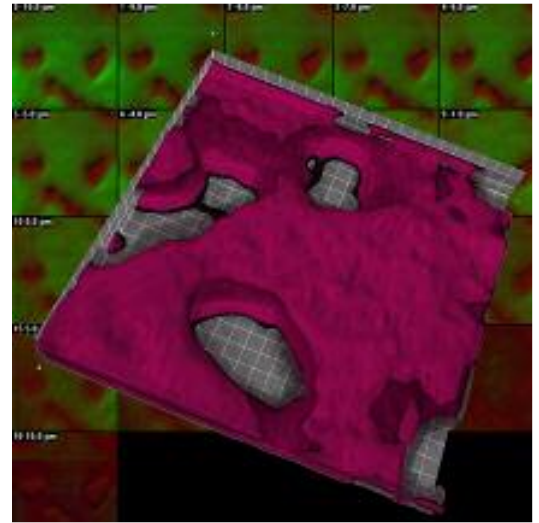
The three-dimensional recording of the object subsequently produces a volume image of the sample.

Application

The method can be applied whenever fluorescence dyes cannot be used (e.g. in transparent polymers other technical products) or lead to problems in three-dimensional structure determination (e.g. in living cells). dCAM can simply integrated into current systems.

Current status

A patent on the invention was registered by the University of Siegen in July 2002. It is published under Patent No. WO 2004008217. A prototype is available for demonstration purposes.



The picture shows in the front a 3D Image of ink droplets on normal ink-jet foil and in background the raw data image with dCAM channel (green coded) and transmission channel (red coded)

On behalf of the University of Siegen, PROVendis GmbH offers licences for the production and commercialization of the system to innovative companies. Please contact us!

Reference: **dCAM**

Advantages

- No dyeing of the sample necessary
- No contamination with toxic fluorescence dyes
- Use of non-fluorescent dyes
- Improved colour channel separation if several chromophores are present
- Undisturbed by ambient light
- 3D recording of biological samples
- Homogeneity measuring inside technical materials, e.g. polymers, with extremely low detection limit

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