

"Method of Fluorescence Imaging"

Description

This invention relates to bio-imaging based on the recording of fluorescence lifetime or fluorescence spectrum for every single pixel by raster scanning the biological sample.

The raster scanning is performed by scanning the excitation UV/Vis light beam by projecting it towards the chosen region of the sample. Being excited, the fluorescence signal is collected by a photo-detector and manipulated by electronics that deliver the output data to the computer. The experimental data undergoes on-line or off-line analysis by correlating respective fluorescence properties with some morphological structures or features of the sample. Prior to the raster-scanning the global analysis of the fluorescence properties of the sample is performed by a Digital Micromirror Device (DMD).

Using the DMD chip is considered the main novelty of this innovation since it allows pre-scanning of the sample before real measurement. It initially previews the morphology of the sample and then segments the image to identify common regions which sequentially transfers to the DMD illuminator to illuminate only that specific area of the sample. Averaging measurement follows which is then accurately fitted with a mathematical model to extract key parameters. The remarkable feature of this chip is that it offers independent control over the mirrors within the matrix of mirrors.

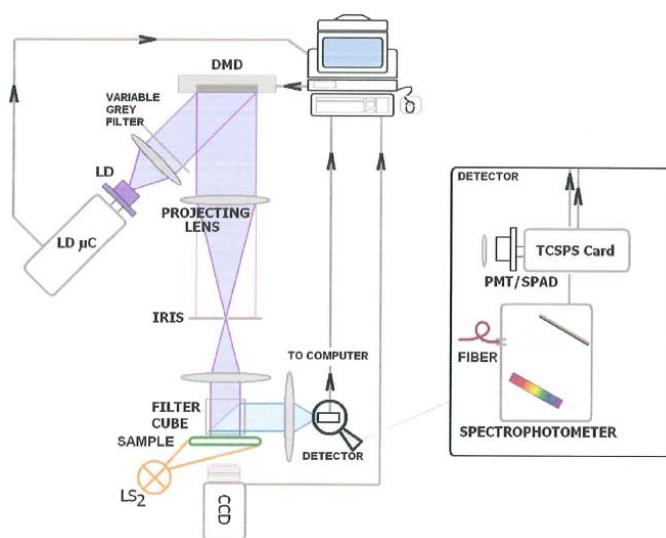
The invention addresses improvement in the FLIM (Fluorescence Lifetime Imaging) or HIS (Hyper-Spectral Imaging) raster-scanned imaging by simplifying the acquisition setup, speeding-up the data analysis by on-line analysis based on global approach and reduction of cost of the imaging device.

Innovative aspects and main advantages

- Simple and relatively cheap setup
- Fast and accurate
- Data analysis performed on-line while scanning
- Fixed, robust and rigid system construction
- Software control over every hardware element

Areas of application

- Bio-imaging companies
- Imaging companies



Stages of development

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