

Actively switched beam splitter (P-1216)

Key Facts

- Spectrally gap-free beam splitter
- No maintenance or astigmatism
- Monolithic design
- Particularly suitable for STED and RESOLFT microscopy

Abstract

In order to separate excitation light travelling to a sample from light emitted by a sample in fluorescence microscopy, dichroic beam splitters are usually used. Different beam splitters are required depending on the light spectrum involved. This requires constant changing and acquisition of fluorescence dye-specific dichroic mirrors and corresponding readjustments of the microscope.

The Technology

DKFZ researcher Dr. Johann Engelhardt developed an actively switched beam splitter based on polarizing beam splitters in combination with a Pockels cell (see Figure). The resulting monolithic beam splitter is spectrally gap-free and can be used for all fluorescent microscopes using pulsed excitation light.

Development Stage

A passive variant with a Faraday rotator instead of a Pockels cell successfully verified the concept experimentally.

Applications and Commercial Opportunity

The actively switched beam splitter is particularly suitable for fluorescence microscopy applications that require several or broader, and even overlapping, light spectra of illumination and detection, as in STED and RESOLFT microscopy. Literally all research fluorescent microscopes using pulsed excitation light can benefit from the presented spectrally gap-free beam splitter.

Inventor

The inventor is Dr. Johann Engelhardt, DKFZ Heidelberg.

Intellectual Property

A patent family "Fluorescence microscope instrument comprising an actively switched beam path separator" has been published as [WO2017060385](https://patents.google.com/patent/WO2017060385).

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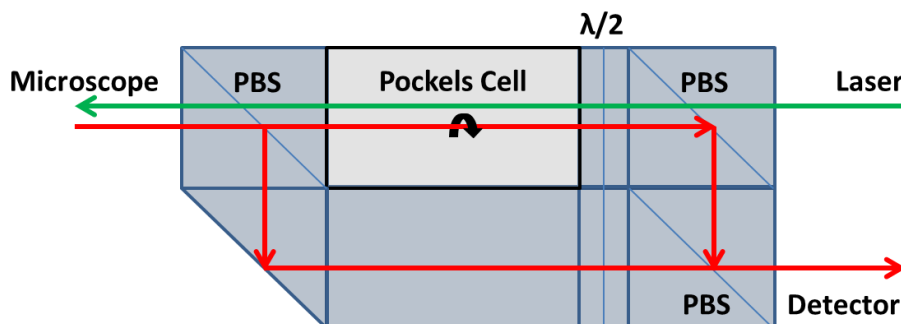


Figure: Model of a monolithic actively switched beam splitter (PBS = polarizing beam splitter)