

TECHNOLOGY OFFERS

Actively Switched Beam Splitter (P-1216)

An actively switched, spectrally gap-free beam splitter based on polarizing beam splitters in combination with a Pockels cell

EXECUTIVE SUMMARY

A DKFZ researcher 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.

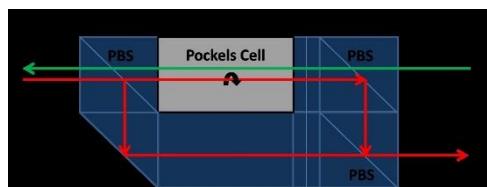


Figure: Model of a monolithic actively switched beam splitter (PBS = polarizing beam splitter)



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https://commons.wikimedia.org/wiki/File:MAX_052913_STED_Phalloidin.png

Category	Indication	Development stage	Seeking
Devices, Microscopy	-----	Prototype	Licensing

BENEFITS

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

TECHNOLOGY BACKGROUND

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.

DEVELOPMENT STAGE

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

APPLICATIONS

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.

INTELLECTUAL PROPERTY

Patent application submitted

- A priority patent application EP15188708.0 “Fluorescence microscope instrument comprising an actively switched beam path separator” has been filed October 7th 2015.
- international PCT patent application has been published as WO2017060385A1.
- EP3359996A1 and US20180188516A1 are pending.

PUBLICATIONS & REFERENCES

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ABOUT THE DKFZ INNOVATION MANAGEMENT

Working at the interface of research and industry, the Innovation Management of the German Cancer Research Center (DKFZ) helps to get new cancer medications, diagnostic tests, and research instruments onto the market as quickly as possible.

The DKFZ with its more than 3,000 employees is the largest biomedical research institution in Germany. At the Center more than 1,300 scientists investigate how cancer develops, identify cancer risk factors and endeavor to find new strategies to prevent people from getting cancer. They develop novel approaches to make tumor diagnosis more precise and treatment of cancer patients more successful. DKFZ is a member of the Helmholtz Association of National Research Centers, with ninety percent of its funding coming from the German Federal Ministry of Education and Research and the remaining ten percent from the State of Baden-Württemberg