

# Stabilization of focus in high resolution microscopy

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## Technology description

Monitoring and correcting relative position without disturbing the use of the microscope objective.

Test beam directed onto a reflective surface connected to the sample/objective evaluated.

Necessary for ultra-high resolution microscopy with increasing spatial resolution

The relative position of a microscope objective with regard to a sample is essential in imaging the sample using the microscope objective.

The invention describes a method in which monitoring and correcting of a relative position of a microscope objective with regard to a sample is easily realized and does not disturb the primary use of the microscope objective. The procedure is carried out using a test beam directed onto a reflective surface connected to the sample and on the other hand using a test beam directed onto a reflective surface connected to the objective. Both results are registered, evaluated and used for correction.

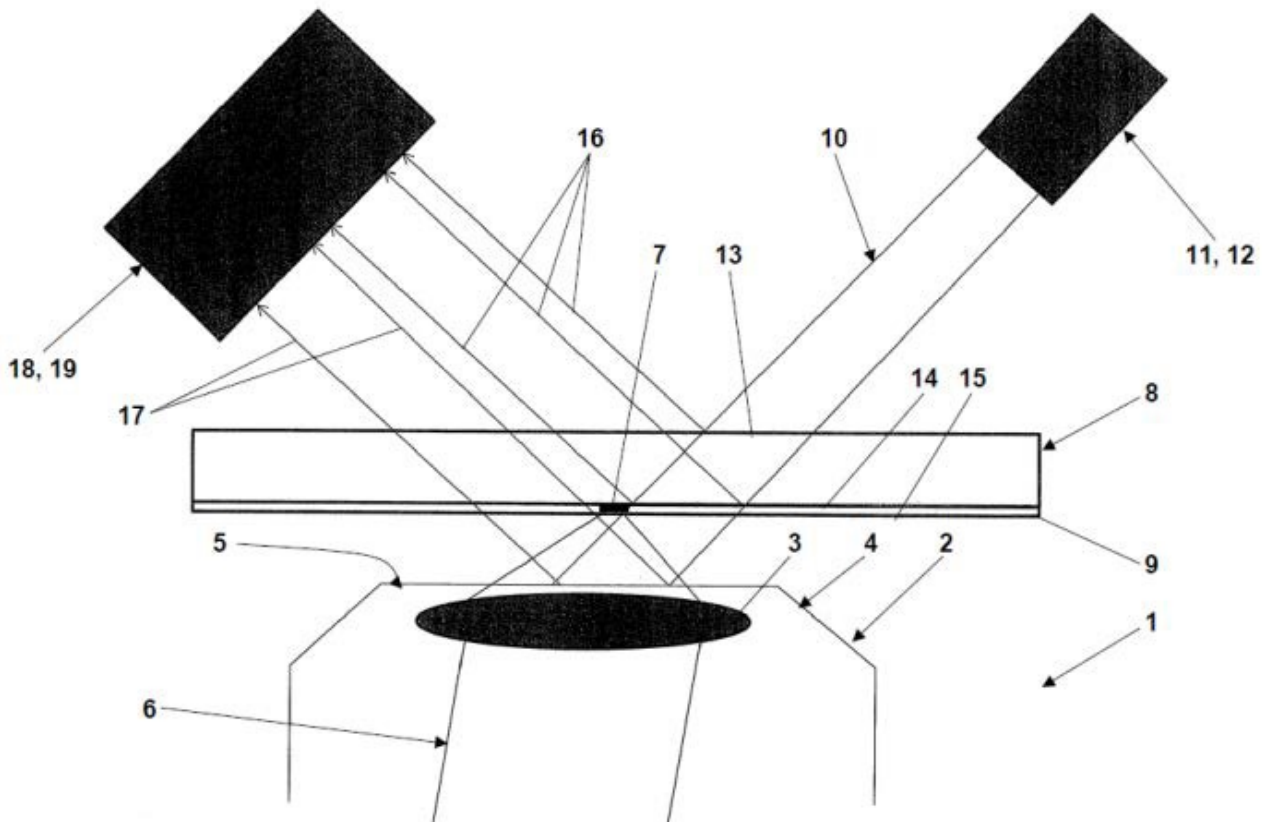
## Solutions

Using a test beam directed onto a reflective surface connected to the sample.

Using a test beam directed onto a reflective surface connected to the objective.

The invention can be used in high resolution microscopy such e.g. in a STED microscope.

A prototype has been successfully tested in experiments, see figure.



It depicts a microscope 1 including a microscope objective 2. The microscope objective 2 comprises a front lens 3 and a frame 4 holding the front lens 3 and having a metallic surface 5. In the operation of the microscope 1, a beam of excitation light 6 is focused into a sample 7 by means of the front lens 3. The focus of the beam of excitation light 6 is moved along a focal plane of the front lens 3 by means of a scanning device of the microscope 1, which is not depicted here. The focal plane of the microscope objective 2 only remains fixed with regard to the sample 7, if relative positions of the sample 7 and of a microscope slide 8 and a cover slip 9 between which the sample 7 is fixed remain fixed with regard to the microscope objective 2.

Institution

[German Cancer Research Center](#)

## 联系我们



叶先生

电话 : 021-65679356

手机 : 13414935137

邮箱 : yeyingsheng@zf-ym.com