

# Adaptive Optics Scanning Laser Ophthalmoscope

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## Technology description

Adaptive optics is used in an scanning laser ophthalmoscope to increase the resolution in retinal imaging to the cellular level. Applications Ophthalmoscopes are used to obtain an image of the eye to diagnose retinal disease, such as diabetic macular edema, retinitis pigmentosa, age-related macular degeneration (MDA) and glaucoma, but today these images are blurred by the aberrations of the human eye, since, in ophthalmoscopy, the optics of the eye serves as the objective lens of the imaging device. This scanning laser ophthalmoscope uses adaptive optics to compensate for aberrations in the eye under examination to provide a dramatic improvement in resolution. Application is expected in a high-resolution diagnostic device for a fast, accurate imaging of eye disease, such as diabetic macular edema, retinitis pigmentosa, age-related macular degeneration (MDA) and glaucoma. Further uses are possible in special devices in which the imaging system is combined with a treatment laser for photodynamic therapy, laser micro-photocoagulation, microperimetry of the retina and eye tracking. Advantages The advantage is in combining the scanning laser source with adaptive optics. A scanning laser source with a confocal pinhole provides higher contrast images than those possible with conventional flood illuminated systems, as used in fundus cameras. The adaptive optics compensate for the monochromatic aberrations of the eye, which can occur to very high orders. Because of this, the volume resolution can ultimately be improved by up to 40 times that of conventional scanning laser ophthalmoscopes. For the first time images are now possible at the cellular level in the living eye.

## Institution

[University of Rochester](#)

## Inventors

[Austin Roorda](#)

Associate Professor

Optometry

## 联系我们



叶先生

电话 : 021-65679356

手机 : 13414935137

邮箱 : yeyingsheng@zf-ym.com