

## Y (why) not? Challenging the confocal microscope

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The current Gold Standard for high-end 3D microscopy is the confocal Laser Scanning Microscope (cLSM). Our new instrument, called „Y“, wants to challenge this status by combining higher speed, better cell viability and an unprecedented degree of automation into a highly compact, thermally controlled enclosure.



The Y relies on the principles of Structured Illumination Microscopy (SIM), but unlike conventional SIM microscopes it employs 2-dimensional (hexagonal) grid-patterns, which simply need to be moved in one direction. It overcomes a major SIM-drawback, its restriction to thin samples, by slit-confocal illumination and detection. This not only increases contrast and hence signal-to-noise ratio, but it also cuts the rolling shutter dead-time between image-frames in half. With respect to speed, it thus surpasses any other SIM approach by at least a factor of two. Compared to a cLSM the speed advantage reaches a factor of 10 or more, and through its parallel detection scheme it cuts photodamage by orders of magnitude.

The Y is a highly automated microscope. Its focus-find capabilities allow to find the cover-slip-sample interface in less than 1 s and to keep it in focus by means of a kHz-rate focus-hold mechanism (patent pending). This enables the acquisition of fast slit-confocal fluorescence overviews without losing focus, using our patented „virtual objective“ approach (see our poster).