THE SMALLEST 3D-MICROSCOPE OF THE WORLD

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To demonstrate the feasibility of 3D live-cell microscopy under most limited spatial restrictions (for instance for space missions), we have built and tested a highly compact microscope based on our hexagonal SIM concept.[1,2] Four high power LEDs (405, 470, 560 and 640 nm) illuminate a hexagonal grid and the grid-image is shifted in 7 steps by rotating a glass window, thus providing the seven phase images for the image reconstruction. The complete microscope, including not only the sample chamber and a unidirectional stage, but also all drive electronics and an AI-supercomputer (Jetson TX-2), fits into a volume of less than 5 liters. We will show 3D-stacks and compare them to images obtained with conventional 3D-sectioning microscopes.

[1] M. Schropp, C. Seebacher, and R. Uhl, “Extending Superresolution into Deeper Layers”, *Photonics 2017*, **4**, 33; doi:10.3390/photonics4020033.
[2] Patent no. DE102011114500 (A1) / US2014313576 (A1).