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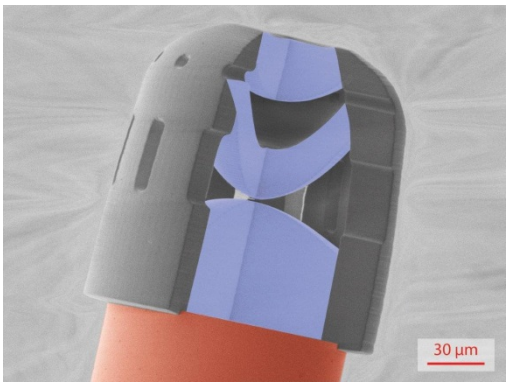
3D Printing of Complex Microoptics – Merging with Plasmonic Nanooptics

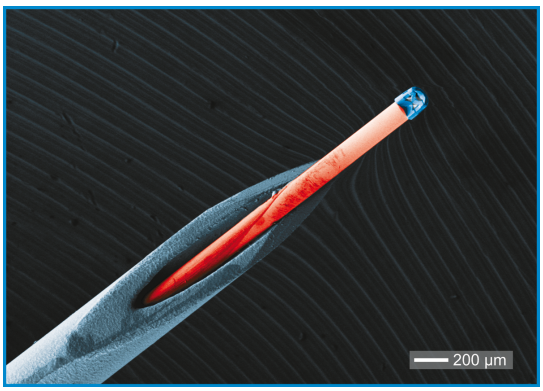
Microoptics has a plethora of applications, ranging from miniature endoscopes in hospitals to beam shaping or imaging. 3D printing with a femtosecond laser and two-photon polymerization allows for manufacturing optical elements directly after their design with an optical CAD program on a computer, with a resolution better than 100 nm and a high accuracy and reproducibility.

The talk is showing first experimental results and discusses the different possibilities and perspectives. Triplett microscope objectives of only 100 µm diameter with excellent imaging properties, fitting into the inside of a syringe, are becoming available with this technology and can be useful for medical applications as well as for novel sensors or inspection methods.

Merging this technology with metasurfaces and plasmonics will be discussed.

[1] T. Gissibl et al., Optica **3**, 448 (2016) .
[2] T. Gissibl et al., Nature Communications **7**, 11763 (2016).
[3] T. Gissibl et al., Nature Photonics **10**, 554 (2016).
[4] S. Thiele et al., Opt. Lett. **41**, 3029 (2016).





Harald Giessen (*1966) graduated from Kaiserslautern University with a diploma in Physics and obtained his M.S. and Ph.D. in Optical Sciences from the University of Arizona in 1995. After a postdoc at the Max-Planck-Institute for Solid State Research in Stuttgart he moved to Marburg as assistant professor. From 2001-2004, he was associate professor at the University of Bonn. Since 2005, he is full professor and holds the Chair for Ultrafast Nanooptics in the Department of Physics at the University of Stuttgart. He is also co-chair of the Stuttgart Center of Photonics Engineering, SCoPE, as well as editor at Nature Publishing Group's "Light, Science & Applications". He received in 2012 an ERC Advanced Grant for his work in Nanophotonics and Plasmonics.