Evaluation of highlighter pens as cheap and cheerful samples for microscope calibration and performance testing

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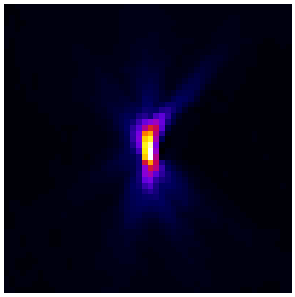
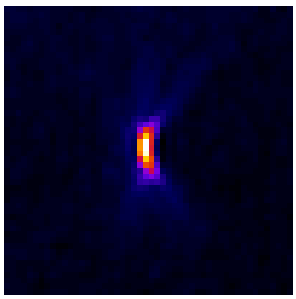
Common samples to check for microscope performance testing involve calibration beads of different flavours or e.g. the Argolight or PSFCheck slides. Most of those samples are well established in the community and, if used properly, deliver precise readouts about the calibration state of the instrument. This is a prerequisite for using the light microscope as a scientific data recording device.

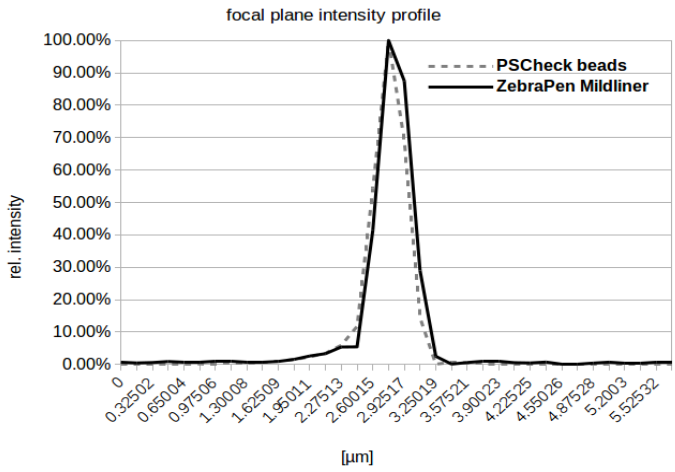
However, all those samples come at a price. While e.g. the Argolight slide can be reused many times it has a high initial cost. The cost for the commonly used beads adds up over the years as they are consumables with a limited shelf life. In search for a less pricey alternative that can be used in environments where frequent instrument checks are required we investigated the properties of the marker fluids of a range of highlighter pen models.

We examined several fluids where fluorescent particles could be found. We measured their exact size and size range distribution, bleaching behaviour under different lighting conditions, spectral signature and further properties.

We can show that the fluids (and particles therein) of some of the tested markers have the potential to be used for microscope performance testing, e.g. to replace sub-resolution beads.







top left: PSF cross section of a commercial PS Check bead
bottom left: PSF cross section of a Zebra Pen Mildliner particle
scale: images are 8.13µm x 8.13µm
top right: intensity profiles across the centre of both

Poster and accompanying datasets are available from http://webdav.tuebingen.mpg.de/LM/