# MICROSCOPE QUALITY CONTROL FOR QUANTITATIVE IMAGING

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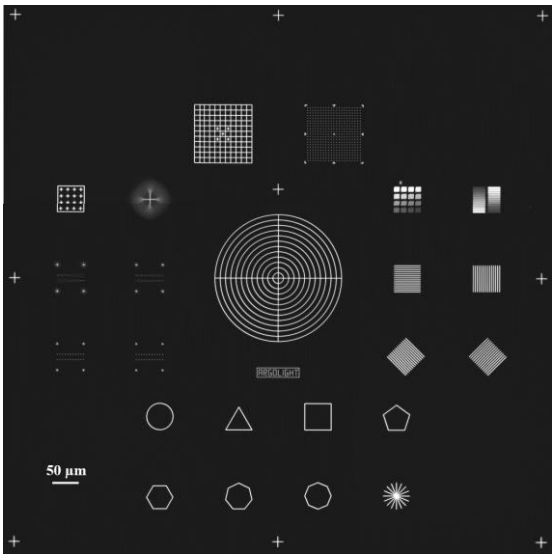
Although quality control (QC) of fluorescence microscopes is a topic that appeared about twenty years ago in academic laboratories [1] and national regulatory agencies [2], it is still topical as it was for example in the program of the Core Facility Satellite Meeting of the 15th and 17th international ELMI meetings in 2015 and 2017. Due to the increasing complexity of the instrumentation used for confocal and wide-field fluorescence microscopy, national metrology institutes [3], microscopes manufacturers [4], and core facilities [5] have gotten involved in identifying, making and/or testing different tools, both hardware and software, to assess the numerous aspects of fluorescence microscopes. Indeed, QC is important to remove the bias introduced by the microscopes in life sciences experiments. When dedicated protocols are correctly followed [6], the experiments reproducibility can be improved.




We have developed a new process that enables the etching of long-term fluorescent multicolor patterns at the sub-µm scale, both in 2D and 3D, embedded in glass (*cf.* figure on the left). Based on this new process, fluorescent patterns and dedicated image processing algorithms are shown to be suitable for complete and quick QC of fluorescence microscopes [7]. In this work, we show how microscope QC can turn an imaging fluorescence microscope into a quantitative device. Non-exhaustively, this new solution enables the QC of: illumination power, illumination inhomogeneity, field distortion, chromatic shifts, resolving powers, stage repositioning repeatability, etc.

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