QUALITY CONTROL OF MODERN FLUORESCENCE MICROSCOPES

Arnaud Royon, Gautier Papon
Argolight SA, Cité de la Photonique, Bâtiment Elnath
11 Avenue de Canteranne, F-33600 Pessac, France
E-mail: a.royon@argolight.com

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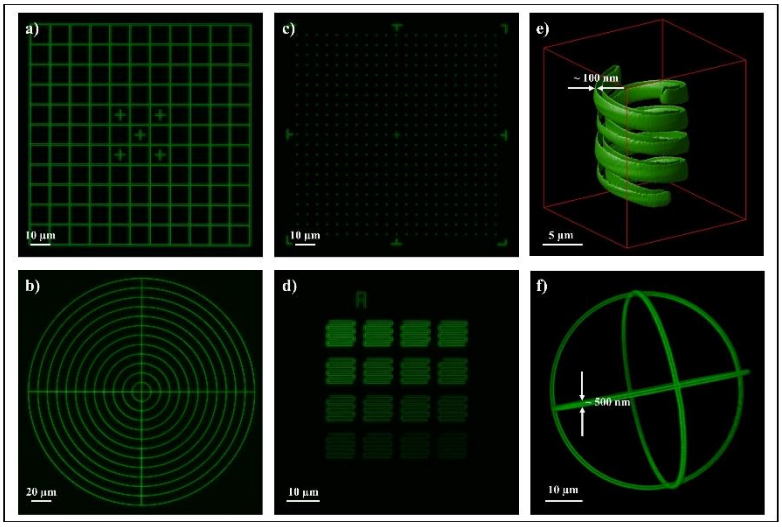
Although quality control (QC) of fluorescence microscopes is a topic that appeared about twenty years ago in academic laboratories [1] and national regulatory agencies [2], it is still topical as it was for example in the program of the Core Facility Satellite Meeting of the 15th and 17th international 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: (i) for core facilities, to assure the performances of the microscopes; (ii) for microscope manufacturers, to guarantee the microscopes' specifications; (iii) for end users to remove the bias introduced by the microscopes in their experiments and improve reproducibility.



We have developed a new process that enables the etching of long-term stable fluorescent patterns with sub-micrometer sizes in 2D and 3D inside glass (*cf.* figure on the left). Based on this new process, fluorescent patterns and dedicated image analysis algorithms are shown to be suitable for complete and quick QC of fluorescence microscopes [6]. Non-exhaustively, this new solution enables the QC of: illumination power, illumination inhomogeneity, field distortion, chromatic shifts, resolving powers, etc.

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