

Improving the resolution of optical far-field microscopes using structured illumination

Anne Sentenac

In this talk, we will show how using structured illumination permits to improve significantly the resolution of far-field microscope, either for fluorescent samples or for unstained samples. This technique consists in recording many images of the same sample under various illuminations. A reconstruction algorithm [1] is then used to extract the super-resolved map of the sample from the stack of images. The ultimate resolution of the microscope is strongly dependent on the spatial frequency content of the illuminations.

Structured illumination microscopy using unknown speckle patterns [2].

References

[1] E. Mudry et al, Nature Photonics, 6, 312–315 (2012)

[2] Volume: J. Girard et al, Phys. Rev. Lett., 109, (2012)