

MEASURING THE PHASE AND INTENSITY OF THE LIGHT: COMPLEMENTARY INFORMATION FOR BIOLOGICAL SAMPLE CHARACTERIZATION AT THE NANOSCALE.

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Conventional optical imaging techniques are only sensitive to the light intensity. However, many other optical parameters can be probed to enhance the quantity of information retrieved from a biological sample. I will discuss in this presentation how and why measuring the so-called phase of the light. Applications both in the scope of label-free microscopy and for 3D fluorescence super-resolution will be discussed. In particular, I will show that this quantitative imaging modality allows to identify without labeling many organelles at high frame-rate and for any duration¹ in living cells. Then I will move to the application of imaging both the intensity and the phase of fluorescent single emitter and demonstrate that it leads to single molecule 3D localization and 3D super-resolution even at depth in biological tissues².

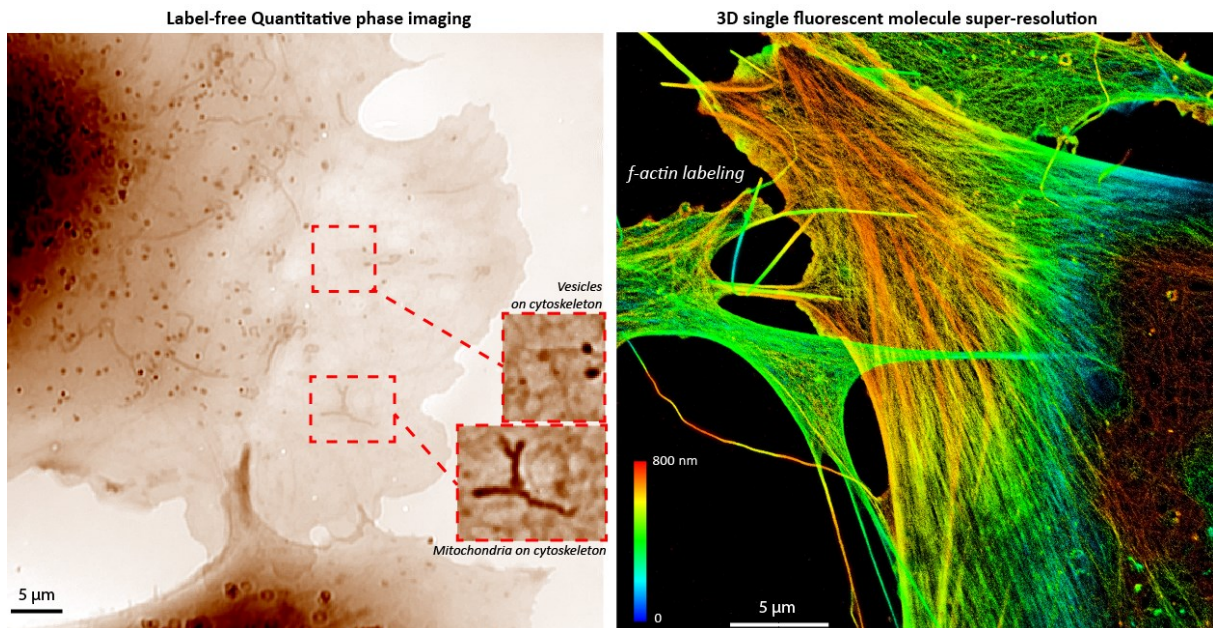


Figure 1: (Left) Quantitative phase imaging of label-free human fibroblasts. (Right) 3D super-resolution image reconstruction using quantitative phase and intensity measurement of *f*-actin.

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2. Bon, P. *et al.* Self-interference 3D super-resolution microscopy for deep tissue investigations. *Nat. Methods* **15**, 449–454 (2018).