

## Super-Oscillations for the Life Sciences

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Structured light with sub-diffractive features had a significant impact on the life sciences, primarily because of the remarkable needs to visualize, activate and monitor biological microenvironments. The development of fluorescent probes has allowed observations at the single molecule level, whilst the recent introduction of super resolution microscopy has allowed imaging of an array of nanoscopic biological complexes with unprecedented resolution. Super-oscillatory waves varying anomalously inside a fixed spatial region allow novel sub-diffraction resolution approaches and thereby their physical properties are tremendously relevant for spectroscopic cellular explorations, biosensing and high resolution in-vivo imaging.

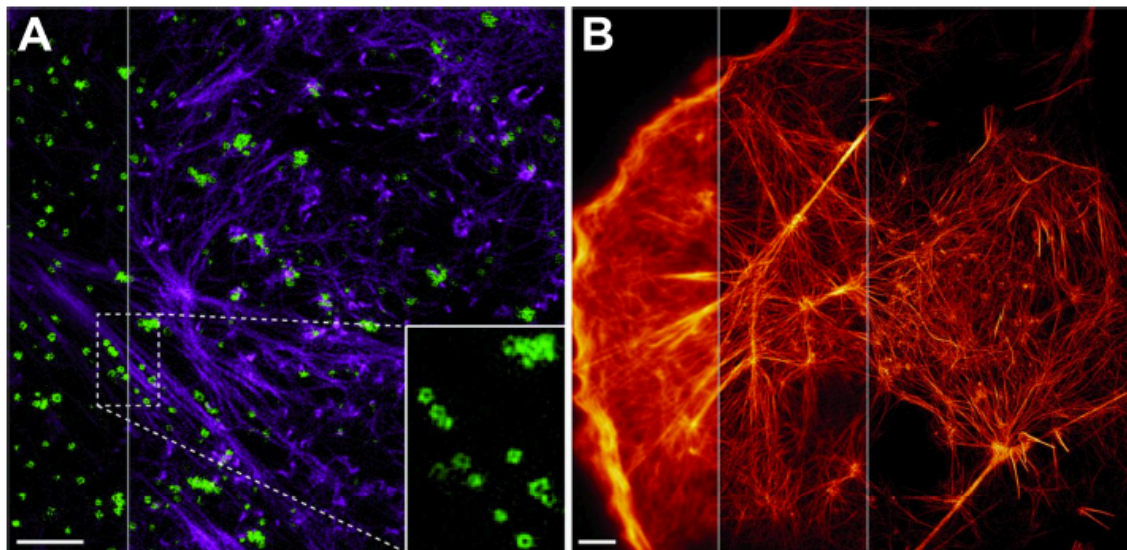


Figure 1: *Extended-resolution structured illumination images of (a) endocytic and (b) cytoskeletal dynamics*[4]

### REFERENCES

- [1] K.V. Sreekanth, Y. Alapan, M. ElKabbash, U.A. Gurkan, E. Ilker, M. Hinczewski, A. De Luca and G. Strangi *Nature Materials* 15, 4 4609 (2016)
- [2] K. V. Sreekanth, Y. Alapan, M. ElKabbash, Amy M. Wen, Efe Ilker, M. Hinczewski, U. A. Gurkan, Nicole F. Steinmetz and G. Strangi *Advanced Optical Materials* 4, 1767–1772 (2016)
- [3] S. Perumbilavil, A. Piccardi, R. Barboza, O. Buchnev, M. Kauranen, G. Strangi, and G. Assanto, *Nature Communications* 9, Article number: 3863 (2018)
- [4] Li D, Shao L, Chen B, Zhang X, Zhang M, Moses B, Milkie D, Beach J, Hammer J, Pasham M, Kirchhausen T, Baird M, Davidson M, Xu P, Betzig E. Extended-resolution structured illumination imaging of endocytic and cytoskeletal dynamics. *Science* (80). 2015;349(6251).