LSFM COHERENCE MODULATION TO REDUCE SPECKLE

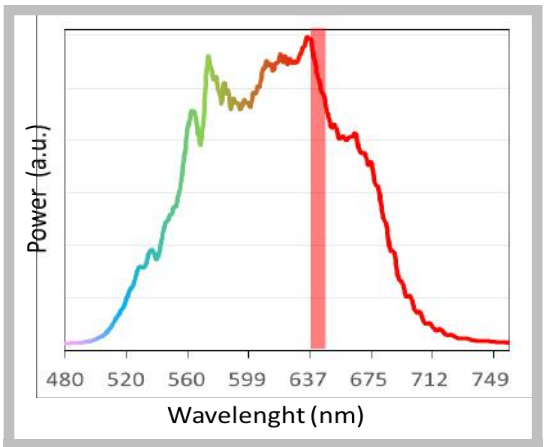
WHITE LASER (FYLA SCT) VS. DIODE LASER

Dr. Pablo Loza Alvarez (ICFO - The institute of Photonics Science)

The Layout

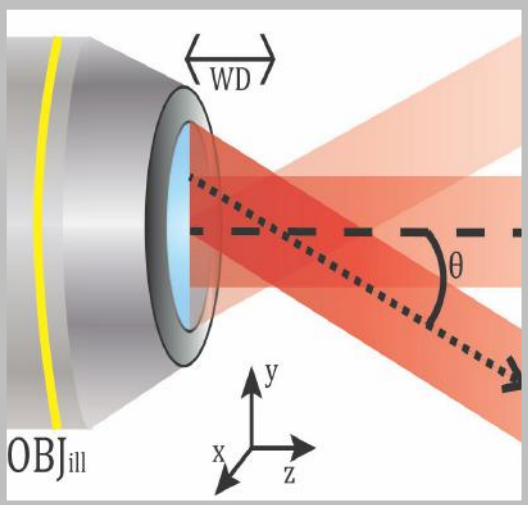
- FYLA SCT500 all fiber pulsed white laser
- Diode Laser (Cobolt 638MLD)
- Cilindric Lenses
- Galvanometric Mirrors
- Polarizers / Analizers

The Layout shows part of the Key components used for this experiment trial.



TEMPORAL COHERENCY: Supercontinuum laser generation

SPATIAL COHERENCY: Temporal Averaged (Pivoting)



KEYWORDS • FYLA SCT500 Super continuum Laser • Free Fluorescence Marking • Bio Imaging • Label Free Light Sheet Illumination Microscopy • Fluorescence Vision • Scattered Light • Confocal

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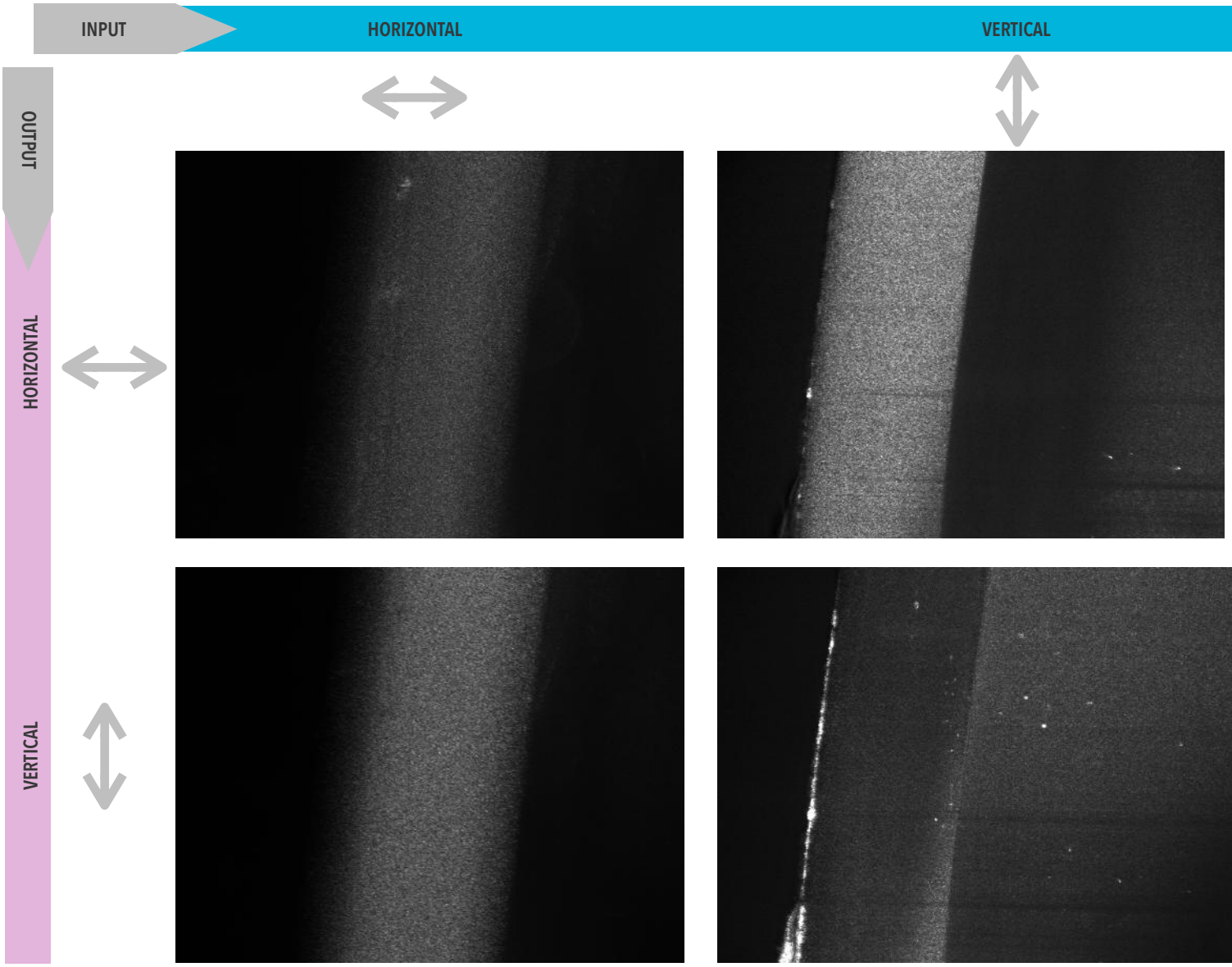
The Scanning



ABOVE. FEP Tube with Sgarose inside, tested from different scanning views for measuring Sepckle

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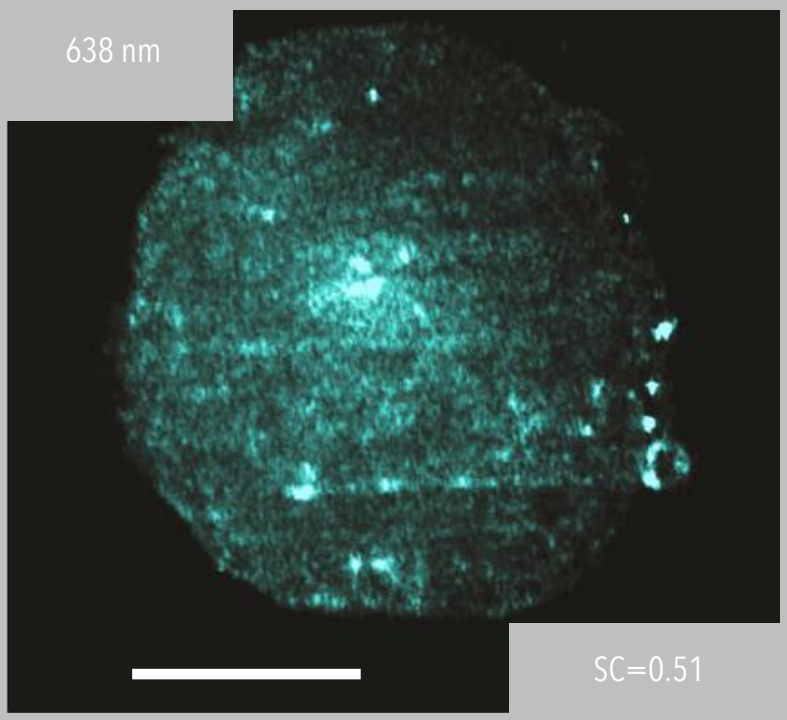
The Proof

Below a comparison between the two modes of emision/scanning , including the specckle factor (SC) whereby the lower SC value, the better image resolution, being the SCT based images consistently better.

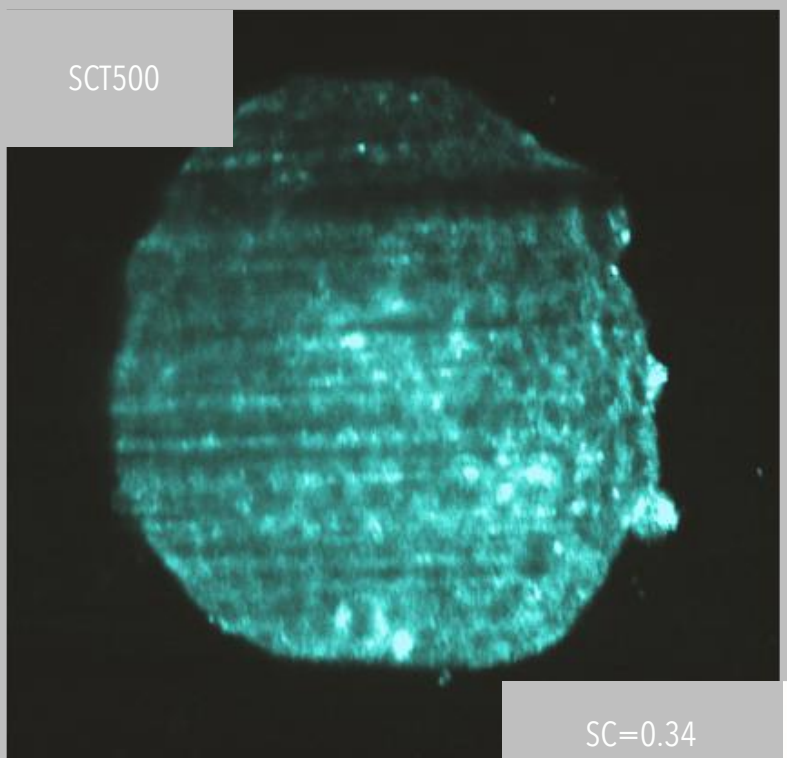
STANDARD LASER BEAM EMISION

638 nm



SC=0.51

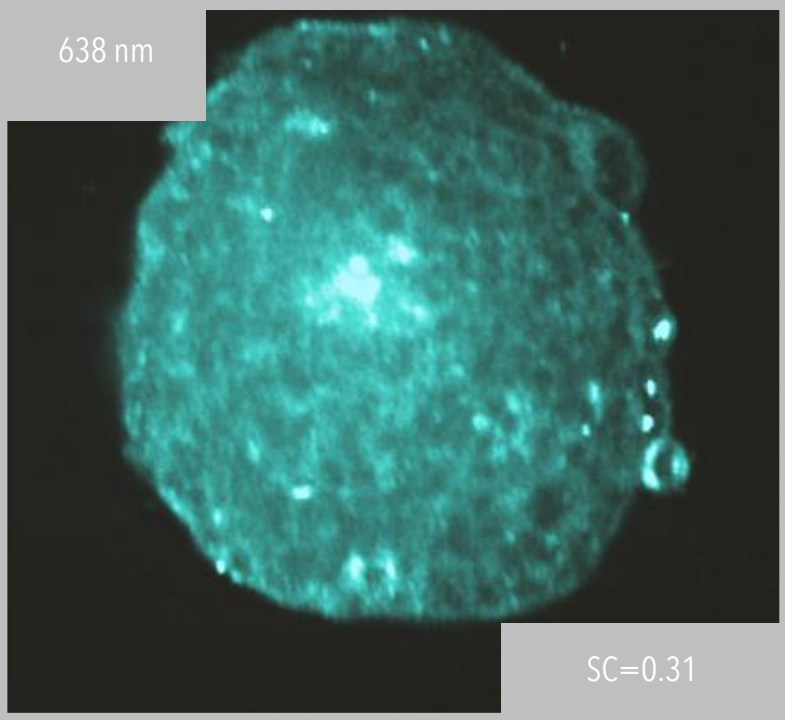
SCT500



SC=0.34

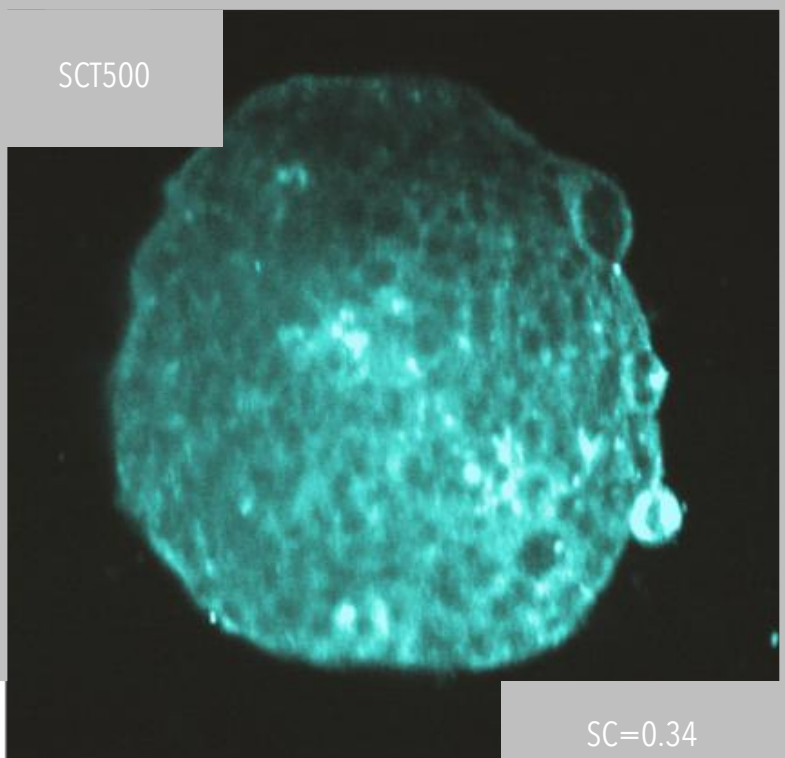
PIVOTING LASER BEAM EMISION

638 nm



SC=0.31

SCT500



SC=0.34

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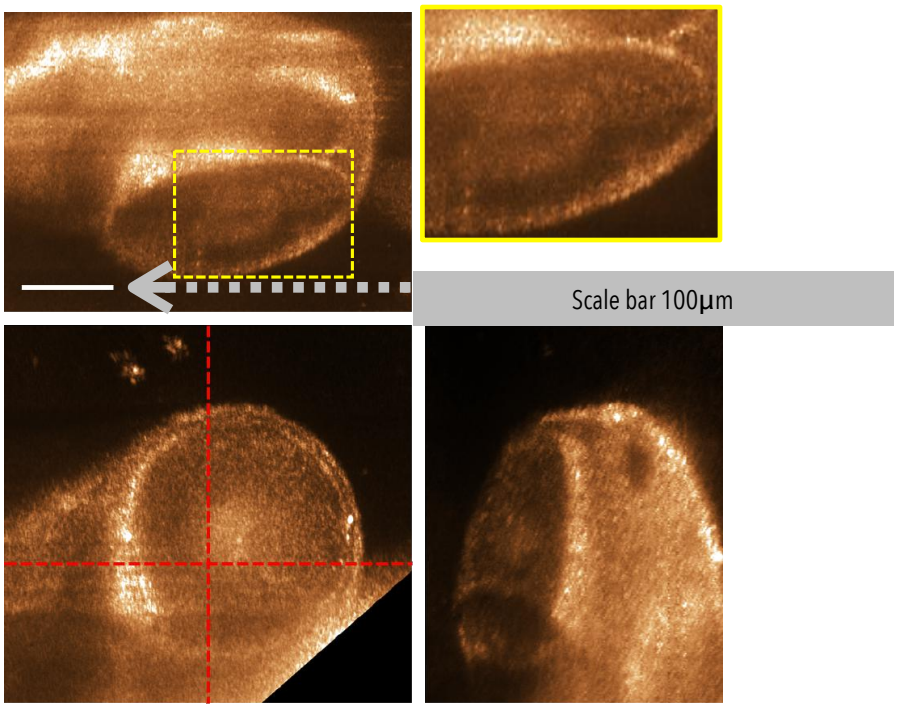
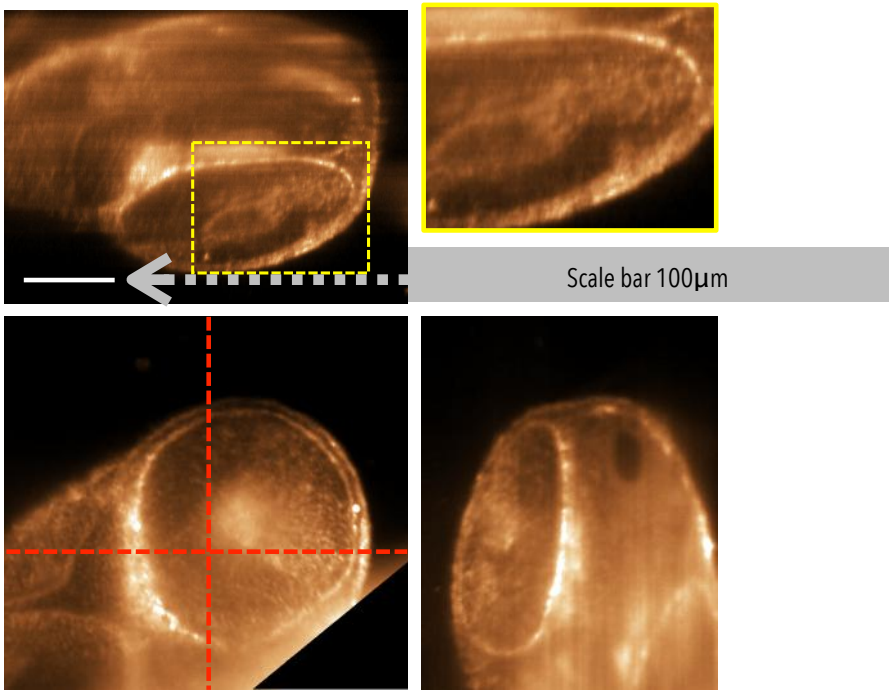
The Achievement

- Eliminating coherency which is critical to reducing the effects of speckle: **the SCT500 has the right features.**
- The combination with **Pivoting enhances the contrast by up to 20%.**
- The new technique "Elastic scattering light sheet microscopy" was **demonstrated as a "label free" alternative to fluorescence.**
- **This technique is proposed as an alternative to histology,** which can be performed in vivo and with minimal phototoxicity.

RIGHT. XYZ Cuts of zebra fish , no pivoting using a 638nm laser.



RIGHT. XYZ Cuts of zebra fish , pivoting using a SC T500 white laser.



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