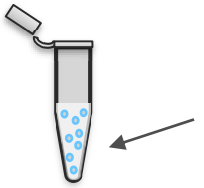
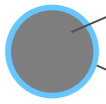
SpheroRuler

Calibration beads for super-resolution microscopy





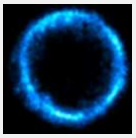
Polymer microparticle

Covalently anchored fluorophores
Far-red fluorescence (Excitation peak= 647nm)

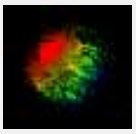
Ø 1µm

- 50 µL suspension in PBS
- 7x10^8 particles per mL
- Hydrophilic surface, water-soluble

SpheroRuler beads will appear as:



1µm-diameter hollow ring structures in 2D SMLM/confocal imaging



1µm-diameter spheres when reconstructed in 3D SMLM microscopy

Compatible imaging modes:

- dSTORM (HILO, TIRF)
- SRRF-Stream
- Confocal/Airyscan confocal
- SEM

What is it used for?

- ✓ **Calibration tool**
  - x-y-z measurement
  - 3D reconstruction fidelity
  - Image quality/resolution
- ✓ **Drift correction, position guide***
- ✓ **Ruler***
- ✓ **Demo & training**

**The SpheroRuler beads can also be loaded together with biological samples.*

Key features

Stable blinking

- ✓ *Coated with a 647-fluorophore known for its excellent blinking capacity in superresolution microscopy*
- ✓ *Suitable for SMLM applications*

Reliable

- ✓ *Inert object*
- ✓ *Size thoroughly characterized by SEM (error margin +-0.05µm)*
- ✓ *Allows to get precise numerical validation*

Well-defined shape

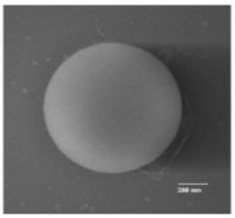
- ✓ *Sharp hollow ring allowing to check image resolution quality and quickly spot artefacts*

Easy to use

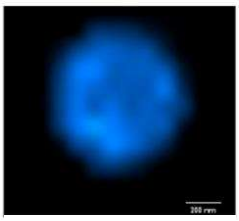
- ✓ *1µm size, easy-to-spot*
- ✓ *Monodispersed*
- ✓ *High intensity*
- ✓ *Spherical size: orientation doesn't matter*
- ✓ *Fast protocol < 20min*

Results

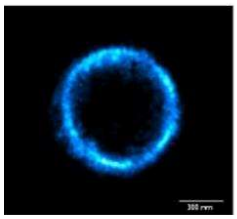
SpheroRuler beads observed with different microscopy techniques:



SEM microscopy

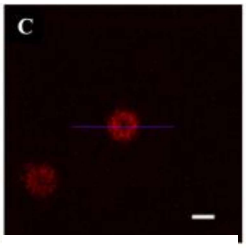


Epifluorescence

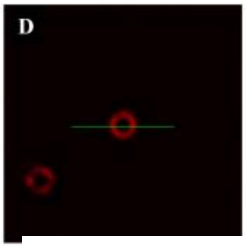


dSTORM (2D)

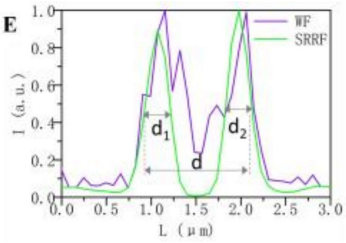
SpheroRuler beads observed with SRRF-Stream



Wide field



SRRF-Stream



Pictures of SpheroRuler beads acquired in wide-field (C) and SRRF-Stream super-resolution (D) imaging. Scale bar = 1µm (E) Fluorescence intensity distributions along the solid lines in C and D. *Image credits: Yao Baoli, Xi'an Institute of Optics and Precision Mechanics, Chinese Academy of Sciences, 2023*

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