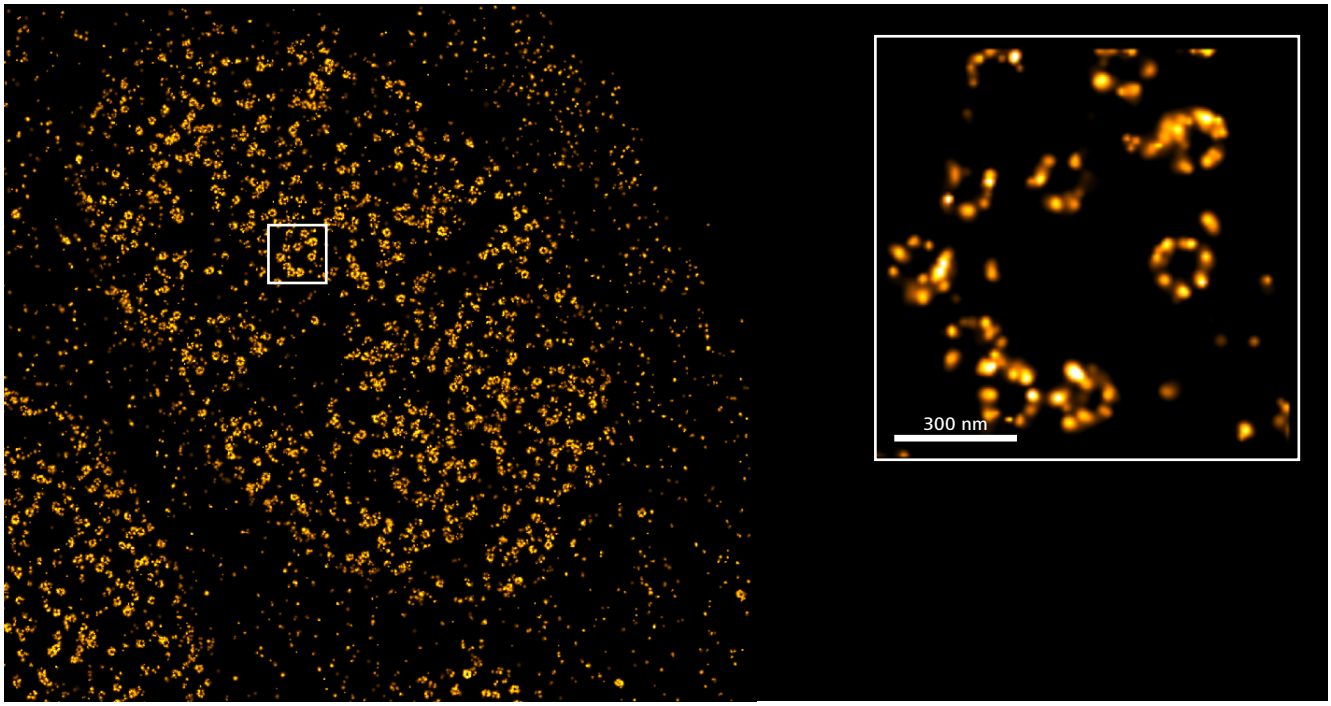
ZEISS Elyra 7

Single-Molecule Localization Microscopy



Eight-fold symmetry of the nuclear pore complex. Xenopus laevis *A6 cells (epithelial kidney cells). Gp210, a nuclear pore complex protein was labelled with Alexa Fluor 647.*

In single-molecule localization microscopy (SMLM), fluorescent molecules are sparsely activated so that only one out of many will be in its on-state within the volume of a single point spread function (PSF). This lets you mathematically determine its center of mass with a localization precision much more accurate than the PSF itself. Once recorded, the molecule is returned to its off-state and the cycle of activation / deactivation is repeated until all molecules are captured. The localizations are plotted in a new super-resolution image.

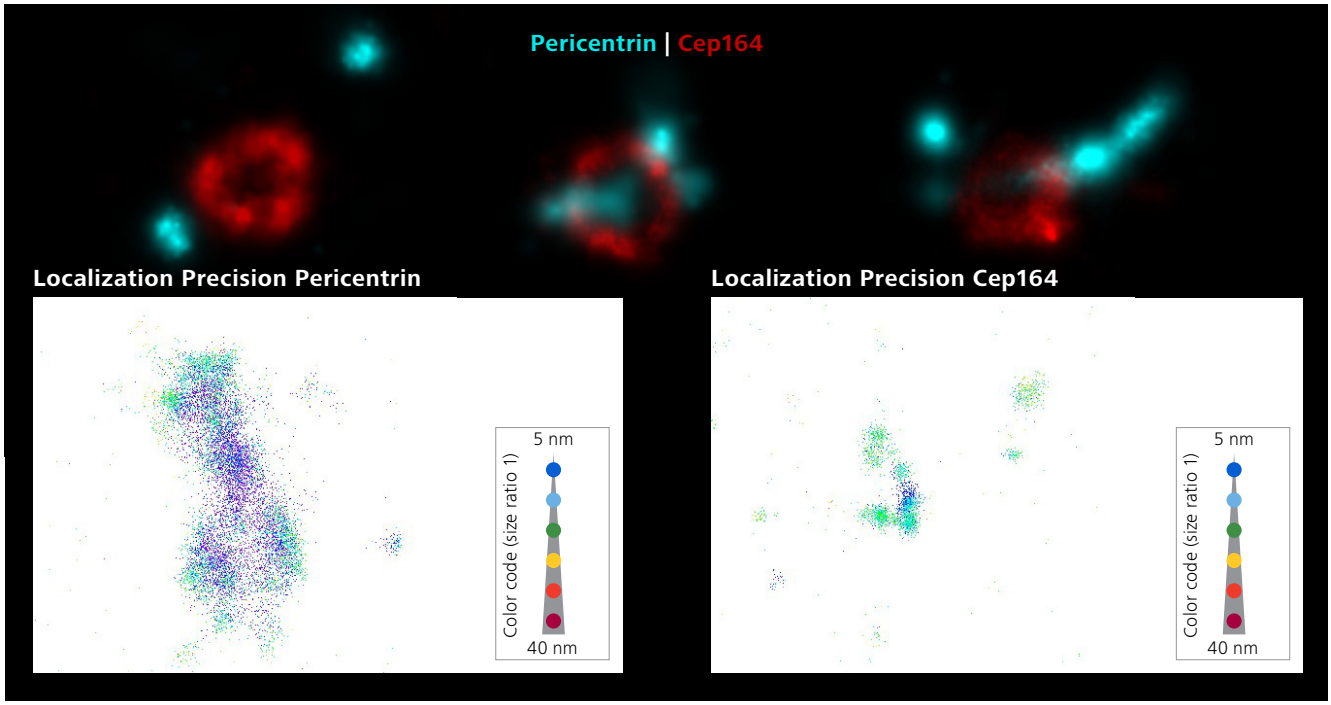
With Elyra 7 you can use SMLM techniques such as PALM, dSTORM and PAINT to achieve lateral resolution of 20 – 30 nm. The ZEN imaging software will seamlessly perform the image reconstruction of your data.

In addition, Elyra 7 provides you with 3D SMLM mode based on PRILM technology. The PSF is reshaped for encoding the Z position, so while acquiring only one plane, you get volume information of 1.4 µm depth at 50 – 80 nm axial resolution. Thus, you can acquire 3D data from a whole cell with consistent molecular precision.

Front page image: U2OS cell stained with Phalliodin-AF647 imaged on ZEISS Elyra 7 using Idylle Everspark buffer.
Magnified images show widefield and localization microscopy images respectively of the highlighted area.

Idylle Everspark Buffer

Sample Preparation for Single-Molecule Detection



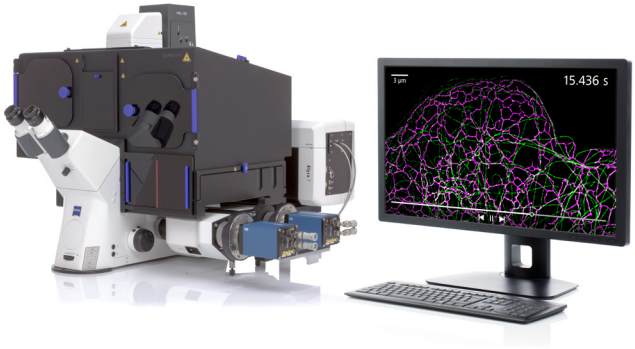
Dual-color localization microscopy with Idylle Everspark buffer. Reproduced with permission from Provost, A., Rousset, C., Bourdon, L. et al. Innovative particle standards and long-lived imaging for 2D and 3D dSTORM. Sci Rep 9, 17967 (2019). https://doi.org/10.1038/s41598-019-53528-0

The Idylle Everspark buffer is specifically designed to facilitate sample preparation for dSTORM super-resolution imaging. A deoxygenated buffer is central to promote fluorophore blinking and thus single molecule detection, required for dSTORM imaging. With classical buffers, such as the Glox buffer, fluorophore blinking lifetime is limited to a few hours. With Everspark Buffer, it is now possible to increase sample lifetime to several weeks.

- Ready-to-use dSTORM super-resolution microscopy buffer
- Long-term and stable fluorescence imaging over several weeks
- Up to 6 months performance in individualized packaging providing optimal longevity
- 5 – 20 nm localization precision
- Compatible with a range of fluorophores for simple multi-color imaging (AF647, CF647, ATTO647N, AF568, CF568, AF555, DL550, DL650, JF646, JF549, SulfoCy5, mEOS2)
- Tested and approved by ZEISS and Idylle customers on Elyra 7 (https://twitter.com/Siegerist/status/1360230195442159621)

ZEISS Elyra 7 and Idylle Everspark Buffer

A Powerful Combination for Localization Microscopy



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