

# ONi

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## Aplo Scope

Simple. Engineered. Dynamic. Powerful.



# Aplo Scope

**Resolution**

**Single-molecule localization microscopy (SMLM)**

15 nm in XY (incl. STORM, DNA-PAINT, PALM) within single channel

**Multi-Channel**

Sub-pixel localization alignment between optical channels.

**Lasers**

Diffraction-limited and SMLM in multiple colors with four (4) lasers. Combined overlay up to five (5) colors.

**Power Density**

Defined as power at the sample. Continuously adjustable from 0.01 kW/cm<sup>2</sup> through:

**405 nm:** ≥ 0.5 kW/cm<sup>2</sup>

**488 nm, 561 nm, 638 nm:** ≥ 3.325 kW/cm<sup>2</sup>

**Illumination Control**

Epifluorescence/widefield | HILO | TIRF | LED for bright-field imaging

Simultaneous flat-field homogeneous laser illumination across entire FOV: <40% asymmetry and <40% roll-off within FOV.

**Filters**

**Single-band**

445/30  
527/49  
595/44  
615/40  
673/35  
760/110

**Multi-band**

519/35 | 605/35  
519/35 | 673/35  
605/35 | 673/35  
446/16 | 515/25 | 597/25 | 673/35

**Time to switch between adjacent filters**

Minimum time to switch between filters: ~250 ms  
Maximum time to switch between filters: ~350 ms

**Temperature Control**

User defined sample area temperature range: ambient+6°C to 40°C  
< 1 hour to user defined setpoint

**Control temperature accuracy**

+/- 0.5°C of setpoint

**Focus Z-lock**

Controllable Z offset +/- 10 μm from coverslip interface

Rapid and precise stabilization of microscope focus, with locking technology to minimize Z-drift

<b>Drift Stability</b>	< 5nm/min
<b>Dimensions</b>	<p><b>Aplo Scope</b> 220 mm (w) x 421 mm (d) x 242 mm (h)</p> <p><b>Light Engine</b> 215 mm (w) x 420 mm (d) x 456 mm (h)</p>
<b>Imaging Technologies</b>	<p><b>2D single-molecule localization microscopy (SMLM)</b> dSTORM, PALM, DNA-PAINT</p> <p><b>Total internal reflection fluorescence (TIRF)</b> TIRF achieved by objective-based TIRF Microscopy TIRF depth is dependent on the incident wavelength, incident angle, refractive index of coverslip and refractive index of sample</p>
<b>Camera and Temporal Resolution</b>	<p><b>Camera</b> Teledyne Prime BSI Express</p> <p><b>Frame rate</b> Up to 43.5 FPS with full FOV</p> <p><b>RMS read noise</b> 1.0 e-</p> <p><b>Quantum Efficiency</b> 95%</p>
<b>Objective and FOV</b>	<p><b>Objective compatibility</b> 100X NA 1.45</p> <p><b>Nominal FOV with 100X objective</b> 110 <math>\mu</math>m x 110 <math>\mu</math>m (+/- 0.5<math>\mu</math>m)</p> <p><b>Effective pixel size</b> 130nm</p> <p><b>Sample stage movement</b> 16 x 16 x 5 mm XYZ travel range</p>

Notes on specification determination:

**Resolution:** Determined using TetraSpeck beads with lateral stage stepping of nanometer increments until individual PSF peaks are statistically distinguishable. Improved resolution may be achievable depending on sample preparation, technique, and imaging modality.

**Channel Mapping:** Multi-channel resolution based on channel mapping performed immediately before acquisition.

**Power Density:** measured using a calibrated thermal sensor (ThorLabs S175C) positioned using a custom fixturing jig, analogous to power experienced by a sample when placed on the sample stage.

**Illumination Control:** Homogeneity and symmetry calculated using fluorescent slides dividing the FOV into 50x50 pixel sub-units. Roll-off calculated from average min/max between sub-units, and asymmetry calculated by comparing average value of corner sub-units vertically and horizontally.

**Filter Switching Time:** Minimum and maximum time are calculated based on channel switching between adjacent or opposite filters when accounting for settling time.

**Drift Stability:** Once the Aplo Scope has reached stable operating temperature, approx 1hr pre-heating for a set point of 32°C.

**Nominal FOV:** Due to minute variances in optics, machining tolerances, and assembly, nominal FOV is 110  $\mu$ m x 110  $\mu$ m, but individual machine FOV size can vary by up to +/- 0.5 $\mu$ m.

