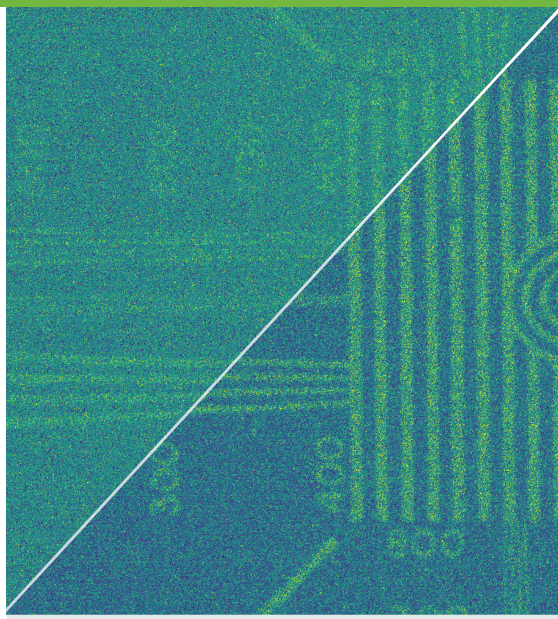
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Low Light Mode

FEATURE NOTE
October 2026

Introduction

The Low Light Mode, also referred to as Correlated Multi-Sampling (CMS) Mode, provides enhanced signal-to-noise ratio for photon-limited imaging applications. By reducing readout noise through correlated multi-sampling, it improves the detection of weak signals and faint image structures. This mode offers an alternative to the standard imaging mode when light is scarce.

Feature Description

In standard mode, the camera acquires two images with identical exposure times but different gains. The two images are combined into a single image with maximum dynamic range.

When Low Light Mode is enabled, the camera performs correlated multi-sampling of two high-gain images instead. By combining the correlated samples, readout noise is reduced, resulting in improved signal-to-noise ratio and enhanced visibility of weak signals.

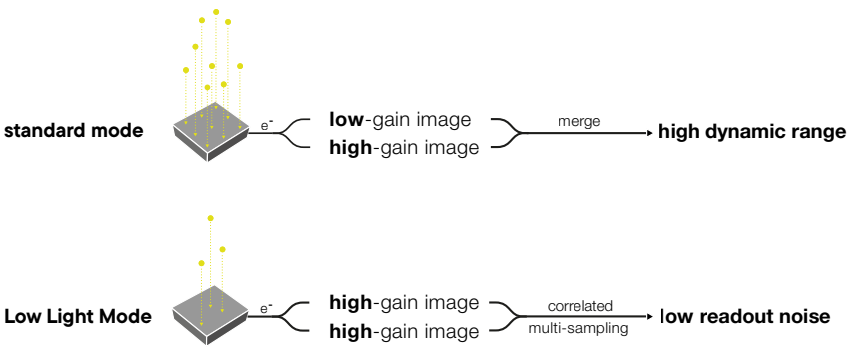


FIGURE 1: Standard mode combines low-gain and high-gain images for maximum dynamic range, while Low Light Mode combines two high-gain images to reduce readout noise and improve the signal-to-noise ratio.

Available on:

- pco.edge 4.2 bi USB
- pco.edge 4.2 bi UV USB
- pco.panda 4.2 bi USB
- pco.panda 4.2 bi UV USB

Enhanced Detection of Weak Signals

To illustrate the effect of Low Light Mode, Figure 2 compares an image acquired in standard mode with an image acquired in Low Light Mode under identical conditions. Reduced readout noise improves the visibility of weak signals and faint image details.

KEY BENEFITS

- Reduced temporal readout noise
- Improved signal-to-noise ratio
- Enhanced visibility of dim structures
- Better performance in photon-limited experiments
- Improved weak fluorescence detection

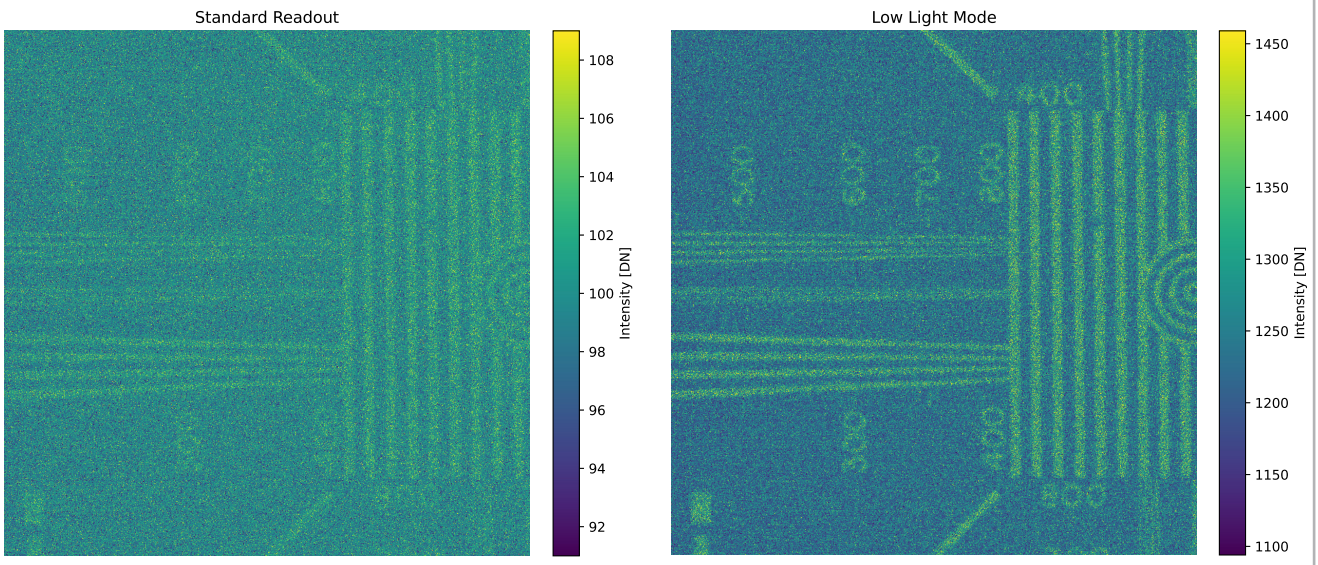


FIGURE 2: Images acquired with pco.panda 4.2 bi USB under identical light-starved conditions and 24 µs exposure. The respective lookup tables (cf. color bar) are set to clip at the bottom and topmost 0.5% of the histogram. Left: Standard readout with conversion factor set to 0.7 e^-/DN and readout noise of 1.9 e^- (rms). Right: Low Light Mode readout with conversion factor set to 0.03 e^-/DN and readout noise of 1.1 e^- (rms).

TYPICAL APPLICATIONS

- Live-cell fluorescence microscopy
- Single-molecule imaging
- Bioluminescence experiments
- Low-light fluorescence detection
- Astronomy
- Scientific imaging under photon-limited conditions

SOFTWARE SETTINGS

pco.camware/pco.vision™:

- Select Rolling Shutter mode.
- In Camera Properties > Sensor Control, select the lower Conversion Factor setting.

The corresponding conversion factor setting is also available through all supported PCO SDKs.

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