sCMOS camera systems at the next level

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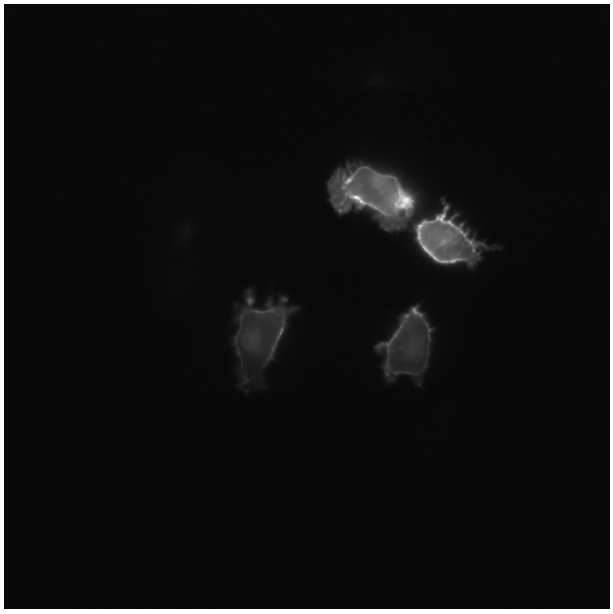
Since the introduction of the first sCMOS cameras based on the new image sensor technology, which has been developed by BAE Fairchild, Andor and PCO, these cameras have reached a significant attention in many different microscope applications, and fueled the applications of nearly all new supper-resolution methods and techniques. Since the field of CMOS image sensor technology continuously develops and improves, new sCMOS image sensors became available in the last two years, including those, which are backside thinned, such that they can be illuminated from the back (BI – back illumination). This allows to use even more of the precious photons coming from a weakly luminescing sample. In association with an improved noise behavior, this allows the application of sCMOS image sensors even in non-cooled camera systems.



Fluorescence image of a membrane bound pH indicator at exposure times down to 20 ms with a signal to noise ratio which is capable to detect even 1-2 % changes in fluorescence intensity

Based on these new sCMOS image sensors, a front illuminated image sensor (QE > 80%) and a back illuminated sCMOS image sensor (QE > 90%), both with 2048 x 2048 pixels resolution and 6.5 µm pixel pitch have been integrated in a new, non-cooled, compact camera platform, pco.panda, which has been tested and applied in microscope applications, ranging from fluorescent pH measurements, and DNA paint, to structured illumination microscopy (SIM). In the presentation features and characteristics of these next level sCMOS camera systems pco.panda 4.2 and pco.panda 4.2 BI will be discussed and experimental results obtained with the cameras will be shown.

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