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## Characterization of low-light cameras for beam diagnostics

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Low-light cameras are often used in beam diagnostics for non-destructive profile measurements. Especially beam induced fluorescence (BIF) monitors are characterized by very low light intensities when measurements are performed in LINACs, high energy transport lines or even synchrotrons.

In this contribution the characterization of three different types of low-light cameras is presented: an EMCCD (ProEM:+512B), an ICCD (Image Intensifier (Proxivision) and CMOS camera (Basler)) and two sCMOS cameras (pco.edge 4.2bi and Kinetix 22). As a light source pulsed LEDs in the wavelength range from 500 nm to 385 nm with light pulse durations of 0.05 ms to 8 ms were used.

While sCMOS cameras proved to have the best resolution, followed by the EMCCD and the ICCD, in this order, the ICCD was the most sensitive, being able to easily detect single photons as observed on images obtained at lowest LED pulse lengths. When used with an electron multiplication gain of 100, the EMCCD is for most of the determined signal-to-noise ratios comparable to the ICCD.

### Summary

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