# JUNGFRAU Detector for Macromolecular Crystallography

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Photon-counting detectors have made a revolutionary impact on synchrotron macromolecular crystallography (MX) in the last decade and changed MX data collection methods and strategies fundamentally. However, in the emerging fields of MX like low-energy phasing and high flux serial crystallography, even the current state-of-the-art detectors are not adequate. Here we describe the application of a direct detection charge integrating pixel-array detector (JUNGFRAU) for such emerging MX techniques. The JUNGFRAU achieves both single-photon sensitivity and high dynamic range without count-rate limitation by a dynamic gain switching technology. The improvement over the previous generation of detectors will be presented using one of the most challenging phasing methods in MX with both test and real-life examples. The gain in data accuracy and acquisition speed makes JUNGFRAU very attractive for next generation MX beamlines at diffraction-limited storage rings.
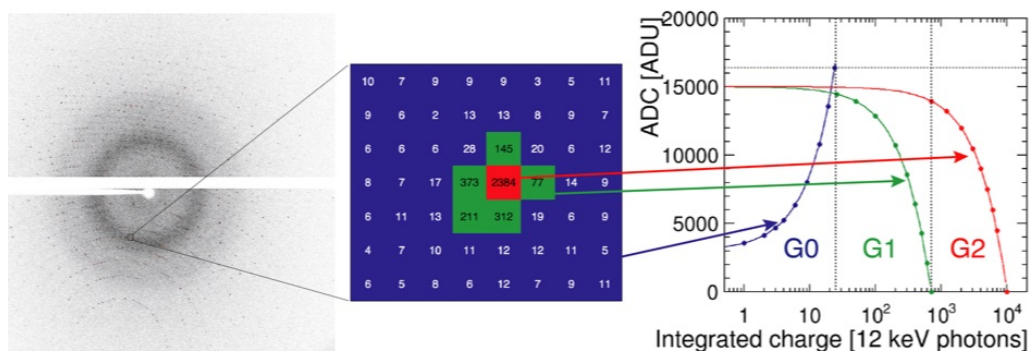
A diffraction pattern measured with a JUNGFRAU 1Mpixel detector and an illustration of the extended dynamic range with three gain levels (G0, G1, and G2).