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## Hybrid Photon Counting X-Ray Detectors: from Basic Functionality to Advanced Operation during X-Ray Diffraction Experiments

Dubravka Sisak-Jung

Hybrid photon counting (HPC) X-ray detectors are crucial components for cutting-edge research at synchrotrons and in laboratories. In short, HPC X-ray detectors provide (i) noise-free detection and readout, (ii) high-quantum efficiency over a wide X-Ray energy range, and (iii) advanced acquisition functionality for versatile experiments at up to kilohertz image rates.

During this talk, we will address the core components of latest-generation HPC detectors, such as the PILATUS3 and EIGER2, explaining their core building blocks as well as their respective functionality. We will highlight key aspects to consider before, during, and after the experiment, to ensure the best possible data quality.

**Primary author(s):** Dr. SISAK-JUNG, Dubravka (DECTRIS Ltd.)