

Detectors for Future Light Sources

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The unique properties of X-Ray Free Electron Laser (XFEL) radiation impose unprecedented requirements on X-ray detection systems (ultra-high (spatial-) resolution, multi-element detection, ultra-high time resolution and high quantum efficiency). Such detectors do not exist today but are of central importance for experiments at free electron lasers. An appropriate detector development program is therefore mandatory.

A dedicated program will have to pursue several approaches from ultra fast X-ray streak cameras operating in the femto-second regime, over linear devices to multi-element ($\geq 2K \times 2K$) pixelated systems with sub-microsecond time resolution. The complexity of the systems will be similar to High Energy Particle Physics Detectors and it is desirable to initiate a broad (multi-national effort) to launch such a program. A preparatory phase to establish specifications and evaluate technological choices will be inevitable. A minimum R&D period of 5 years for the first generation of prototype devices will be necessary.