

Solid State Detector Developments at the Swiss Light Source

Broennimann Ch.

Paul Scherrer Institut, SLS Detector Group, CH-5232 Villigen-PSI, christian.broennimann@psi.ch

At the Paul Scherrer Institut, solid state detector development for the Swiss Light Source SLS is successfully done since several years. Results of these efforts are two large area detector systems which are in operation and installed at different beamlines.

The MYTHEN detector is an array of microstrip detectors installed at the Powder diffraction station of the material science (MS) beamline X04SA. It covers an angle of 60° and has a resolution of 0.005° . Powder patterns can be recorded in a fraction of a second, which opens a new field of experiments. The PILATUS 1M detector (Figure 1) is a large area pixel detector with more than 10^6 pixels, developed for the protein crystallography beamline X06SA. It is used to record classical as well as fine- ϕ sliced crystallographic data with continuous sample rotation. A single PILATUS module is installed at the surface diffraction station of the MS beamline.

Experiments benefit from the properties of the single photon counting detectors: No background from dark current, no read-out noise, very good efficiency in the energy range of 6-15 keV and readout-times below 10 ms. Examples from some experiments are given.

In order to improve the pixel detector, a new read-out chip was designed in 0.25 μ m technology, with improved performance. It has a 20-bit dynamic range and higher count rate capability per pixel. Based on these components the new PILATUS 6M detector for protein crystallography will be built.

We have started the program for a readout chip for the new coherent SAX beamline, which will be optimized to x-ray photon correlation spectroscopy (XPCS) measurements. A possible architecture for such a chip will be discussed.



Figure 1 :The PILATUS 1M Detector