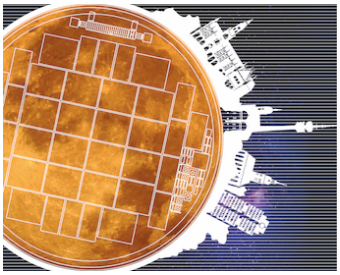

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X-ray Detectors at PSI and Recent Developments using LGADs for Low Energy X-ray Detection

The detector group of the Swiss Light Source at the Paul Scherrer Institut (PSI) develops cutting-edge X-ray detectors in-house, including photon-counting detectors for synchrotron radiation sources and charge-integrating detectors for Free-Electron Lasers (FELs). Planar silicon strip and pixel sensors are commonly used for X-ray energies from a few keV up to 20 keV. In addition, high-Z sensors, e.g. CdTe and GaAs, are being studied to improve the quantum efficiency for X-ray energies above 20 keV, while Low Gain Avalanche Diode (LGAD) sensors and silicon sensors with thin entrance windows are being investigated for the detection of soft X-rays below 4 keV. In this talk, an overview of the detector development at PSI will be given. Results from recent measurements with LGAD microstrip sensors wire-bonded to Mythen-II, a photon-counting readout chip (ROC), and to Gotthard-1.7, a charge-integrating ROC, will be presented. The requirements of LGAD sensors with thin entrance windows for soft X-ray detection will be discussed.

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