

# Detectors for present and future light sources at Elettra

This work reports on the recent activities carried out by the Detector and Instrumentation Laboratory of Elettra Sincrotrone Trieste. Since both the Elettra synchrotron and the Fermi free electron laser are generating photons in the low to medium x-ray energy range from some eV to tenths of keV the activities of the detector and instrumentation laboratory focuses on spectroscopic and imaging photon detectors, which feature high quantum efficiency from below the carbon edge and are operated also in UHV environments. Special focus will be drawn on custom made monolithic and multi element silicon drift detectors for the Twinmic and the XRF beam line at Elettra. Regarding low energy imaging detectors the PERCIVAL CMOS ('Pixelated Energy Resolving CMOS Imager, Versatile and Large') will be discussed which is currently being developed by a collaboration of DESY, RAL, Elettra, PAL and DLS to address the need for this type of detectors for free electron lasers in the soft X-ray regime. The majorities of Elettra's soft x-ray beam lines are employing fast and spatially resolving electron detectors and their associated readout electronics, which have been developed in-house and have been tailored to the specific needs of the respective beam line. In addition devices for in situ beam diagnostics and dose monitoring for synchrotron radiation and FEL beams have been developed and are operated on a daily basis. Moreover, some recent results in basic research on room temperature semiconductors will be discussed. In this presentation an overview of these devices and their application to specific scientific applications will be given and in view of upgrade programs future directions will be discussed.

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