

ARDESIA: an X-ray Spectroscopy detection system for synchrotron experiments based on arrays of Silicon Drift Detectors

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Ardesia is a new research project supported by Italian INFN. Goal of ARDESIA is the development of an X-ray spectroscopy detection system to be used in experiments at synchrotron light sources. The detector will be based on monolithic arrays of Silicon Drift Detectors readout by CUBE preamplifiers. The SDDs arrays are produced at FBK labs in Trento, Italy. First prototypes of 3x3 SDDs arrays, 24x24mm² of active area, have been successfully produced and tested within a project supported by ESA. The read-out of the SDDs is based on a low-noise CMOS preamplifier (CUBE) which allows to achieve very high resolution at short shaping times. In first prototypes, an energy resolution of 123.0 eV FWHM at the Mn-Kalpha line (5.9keV) has been measured at 1us shaping time, while a resolution of 126.4 eV FWHM has been measured at 250ns shaping time. The further processing of the signals is carried out by a custom readout ASIC and a DAQ system. The detection module is expected to be cooled at a temperature of -20°C by a Peltier stage. In the presentation, the main features of the ARDESIA detector design towards synchrotron applications will be presented. Considering the starting stage of the project, the workshop would present a valuable opportunity for the proponents to collect inputs from attendees which may be interested to this development.