

PICASSO: A Detector for Phase-Contrast Mammography with Synchrotron Radiation

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The SYRMEP (Synchrotron Radiation for Medical Physics) collaboration is performing, for the first time in the world, a clinical program of Mammography with Synchrotron Radiation (MSR), utilizing a conventional screen-film system to acquire Phase Contrast (PhC) x-ray images. The next stage of the clinical trial will take advantage of a digital detector tailored for the characteristics of the SR beam (bright, laminar, monochromatic, and highly coherent). Therefore, the PICASSO (Phase Imaging for Clinical Application with Silicon detector and Synchrotron radiation) project has developed a silicon microstrip detector, arranged in the so-called edge-on configuration. The read-out electronics, operated in single-photon counting, is based on the Mythen-II ASIC developed by the PSI detector group. A double-layer prototype has been tested at the SYRMEP beamline. It meets the requirements for clinical MSR regarding: size, since it covers the full SR beam width (210 mm); acquisition speed, because it is capable of handling more than 10^6 photons/pixel/s; efficiency, due to the high absorption in the 15-20 mm sensor depth; spatial resolution, which is determined by the 0.05 mm strip pitch; contrast resolution, thanks to the single-photon counting approach. These characteristics make PICASSO a unique tool for medical and multidisciplinary research, capable of investigating large samples (several centimeters in diameter) with high resolution PhC imaging, also in tomography.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

http://wwwusers.ts.infn.it/~rigon/rigon_summary.pdf

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