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Pixirad/PANalytical - Pixirad: unique hybrid pixel detector technology for X-ray diffraction, scattering and imaging

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Speakers: Arjan Noordermeer, Roelof de Vries, Ronaldo Bellazzini

Abstract: Pixirad is a start-up company that turned hybrid pixel technology originating from the Italian Institute of Nuclear Physics into commercial products. Over the last years, PANalytical and Pixirad have been collaborating on the use of this technology for X-ray diffraction, scattering and imaging applications in the Emyrean diffractometer. In the beginning of 2017, PANalytical acquired Pixirad, and both parties are now jointly working on next-generation hybrid pixel detectors for applications in X-ray diffractometers or other instruments.

Pixirad's technology offers all benefits from hybrid pixel technology:

A very low intrinsic noise, mainly set by cosmic radiation

A very high dynamical range, allowing both the detection of weak and strong signals

A point spread function of only 1 pixel, yielding sharp images without blurring and no parallax problems when dealing with short sample-to-detector distances

A technology that is robust against accidental irradiation by the direct beam and does not require periodic maintenance such as replenishment of detection medium.

On top of these generic benefits, Pixirad's technology is unique in several aspects:

It offers the largest number of pixels on one chip (>240,000), without dead areas, combined with a very small pixel size of only 60 microns

Highest-grade Cadmium Telluride sensor material offering high detection efficiencies at high energy (up to 100keV)

A detector designed specifically for maximum performance of the CdTe sensor

A two-level energy discriminator suppressing both fluorescent radiation, white radiation and higher harmonics, and allowing energy-selecting capabilities for imaging applications ("chromatic photon counting")

The detectors can be tiled to reach a larger active area –the largest product currently available offers almost 2,000,000 pixels

In this presentation, we will further present examples of the combined application of X-ray diffraction and CT-imaging obtained with PANalytical's X-ray diffractometer Emyrean.

Presenters: NOORDERMEER, Arjan; DE VRIES, Roelof; BELLAZZINI, Ronaldo

Session Classification: Industry and Academia on Non-Destructive testing