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PIXIRAD – FROM FUNDAMENTAL PHYSICS TO THE EUROPEAN MARKET

First INFN spin-off company, PIXIRAD is a success story in which a technology deriving from research in fundamental physics is "exported" to the commercial world in a market sector characterised by innovation and high specialisation. Sealing the innovative capacity of the project, in February PIXIRAD signed an agreement for its acquisition by PANalytical, part of Spectris plc, a Dutch company and world leader in instrumentation for materials analysis and characterisation using X-ray techniques.
The spin-off was created in 2012 by a research group of the INFN Pisa division, specialised in the development of radiation sensors based on technologies developed in the field of particle physics and space research. The objective: bringing on the international market highly innovative detectors able to contribute to social and economic development in the areas of digital radiology and industrial and scientific imaging, in particular with X-ray diffraction and crystallography techniques.
The team of INFN physicists thus set up a spin-off with the aim of implementing this technology, which in just a few years has attracted the interest of industrial companies worldwide. In particular, the unique ability of the PIXIRAD technology to ensure efficiency in a very wide energy range (from 1 to 100 keV and beyond) has made its detectors the ideal choice for the structural analysis of materials with techniques that require the use of high energy X-rays, such as X-ray diffraction and crystallography.
PIXIRAD has also proved to be promising in the medical field, in particular in digital radiology, a sector that is becoming of great and growing interest as a result of the transformation of X-ray systems from analogue (with use of radiographic films and image intensifiers) to digital (with the use of fully electronic devices, able to provide the radiological image in real time). In this context, PIXIRAD has developed a new type of digital X-ray sensor with extremely high resolution, which is a significant technological leap compared to current standards: this is a chromatic photon counting sensor, that is to say, capable of individually counting the incoming photons and separating them according to their

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energy. This sensor's mode of operation leads to the best possible ratio between image quality and absorbed radiation dose. Furthermore, the energy analysis of the radiant beam enables, for the first time, a "color" medical imaging, a result expected to significantly increase the information of the resulting images. ■