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TECHNOLOGIES FASTEST X-RAY CAMERA AT XFEL

The installation of the fastest low-energy X-ray camera in the world was recently, successfully concluded at the European XFEL in Hamburg. It is an image detector for electromagnetic radiation in the X band (called

DePFET Sensor with Signal Compression, DSSC) and is based on silicon sensors. The detector is unique of its kind and represents the culmination of more than ten years of research and collaborative, international development by a group of researchers associated with the INFN divisions in Milan and Pavia. This group worked in collaboration with DESY, the University of Heidelberg, and the European XFEL, which coordinates the international DSSC consortium. The detector was specifically planned for X-rays of energy between 0.5 and 6 keV. Specifically, it will enable the ultrafast study of electronic, spin, and atomic structures on a time scale of tens of femtoseconds. The European XFEL is able to produce packets that contain up to 2,700 X-ray flashes. These can be launched in quick succession with only a 220-nanosecond time difference between two flashes. At full capacity, the DSSC detector will acquire images at the speed of 4.5 million images per second and will be able to store 800 images of 1 megapixel. At the moment, a second camera, which will allow better energy resolution and an even higher dynamic interval, is already under development.