# High−resolution X−ray microscope provides insight into nanotechnology

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A new type of microscope developed by a Swiss team from the Paul Scherrer Institute (PSI) and the EPFL Lausanne combines the high penetration power of X−rays with high spatial resolution. This should, for the first time, allow the tiniest internal structures of semi−conductors and cells to be imaged.

Using a PILATUS megapixel detector, it is possible to precisely count millions of individual X−ray photons. This makes it possible to record detailed refraction patterns from a sample whilst it is raster−scanned though the focal spot of the beam. Normal raster scans measure only the total absorption; another limitation is that they are only able to image surfaces, whereas the new technique provides an insight into internal structures.

The many thousands of diffraction patterns are combined into a transmitting X−ray microscope image using an algorithm developed by the Swiss research team. As well as the sample data, the algorithm takes into account the precise shape of the X−ray beam.

The new technique will help discover defects in semi−conductor structures and improve standard microscopy techniques.

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