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“ntCT” nano CT system: Industrial nano computed tomography now commercially available

Würzburg/Hannover: The Development Center X-ray Technology EZRT at the Fraunhofer Institute for Integrated Circuits IIS has further developed the “ntCT” nano CT system in collaboration with partners. This improved system is now commercially available via the system integrator, ProCon X-Ray. “ntCT” is suitable for the microscopically fine investigation of sample objects with a resolution of up to 150 nanometers. By integrating the latest generation of X-ray tubes, the system now supplies outstanding resolution while also greatly reducing the measuring time.

The main functional features of novel material systems are often based on their complex internal structures, which are not accessible by established nondestructive analysis methods. Moreover, the manufacture of microelectronics and micromechanics is becoming increasingly more complex and more compact, not to mention three-dimensional. After decades of successful miniaturization, the industry today produces structures that are often too fine to be investigated using established systems.

Next-generation X-ray tubes

In 2018, Fraunhofer EZRT unveiled the first generation of the “ntCT”, which was able to handle such special requirements. In collaboration with the Swedish company Excillum AB, the X-ray source, which is one of the core components of the system, has been further improved. The result is a considerable increase in performance, such that measuring times have been substantially shortened while offering the same outstanding resolution. Consequently, the system can achieve measuring times of just a few hours for a complete CT scan with sampling down to 50 nanometers and a resolution better than 200 nanometers, now rendering it ideal for industrial requirements as well.

This makes nanoscale tomography suitable for integration into manufacturing environments. In addition to the system’s highly automated operation for most applications, users can access all setting parameters and raw data in an advanced operating mode. For objects such as microelectronics, which require the use of higher X-ray energy, the system can be delivered in a 110-kilovolt version. “The ‘ntCT’ system offers a wide variety of possible applications for practically all sectors that need

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nondestructive 3D analysis with maximum resolution. The system is more than just hardware, it's a complete analytic environment, which accompanies users from the insertion of samples through to the reconstructed data," says Dr. Christian Fella, Head of the "NanoCT System" Group at the Würzburg location of the Fraunhofer Development Center for X-ray Technology EZRT.

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Upgraded system now commercially available

The new version of "ntCT" is now commercially available as part of the "ProCon CT-Alpha" product series from the company ProCon X-Ray GmbH. Collaboration between Fraunhofer EZRT as a research-oriented developer and ProCon X-Ray GmbH as a system integrator allows much faster implementation of the latest technological developments into a market-ready product.

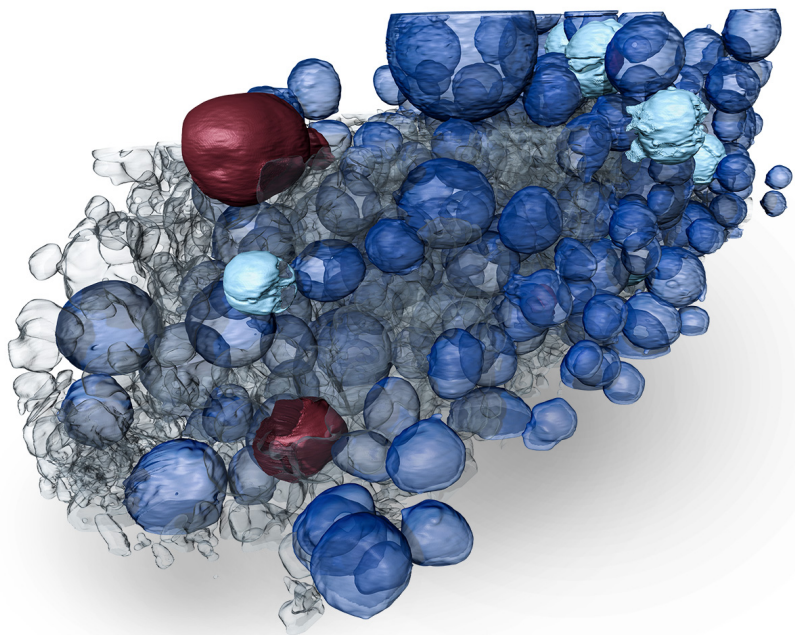


Compact stand-alone design for easy integration into your lab environment. The "ntCT" system offers a unique solution for high-resolution measurements. By applying the latest developments in X-ray research, it is way ahead of established industrial micro-CT scanners. © Fraunhofer IIS

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3D analysis with microscopic resolution: The quality control and damage analysis of Li-electrodes shown here for novel battery research methods with a voxel sampling of 140 nanometers is an exemplary application. © Fraunhofer IIS

IN COOPERATION WITH



The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe. Its research activities are conducted by 74 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of 28,000, who work with an annual research budget totaling 2.8 billion euros.

The **Fraunhofer Institute for Integrated Circuits IIS** is one of the world's leading application-oriented research institutions for microelectronic and IT system solutions and services. It is the largest of all Fraunhofer Institutes. Research at Fraunhofer IIS revolves around two guiding topics: In the area of **"Audio and Media Technologies"**, the institute has been shaping the digitalization of media for more than 30 years now. Fraunhofer IIS was instrumental in the development of mp3 and AAC and played a significant role in the digitalization of the cinema. Current developments are opening up whole new sound worlds and are being used in virtual reality, automotive sound systems, mobile telephony, streaming and broadcasting.

In the context of **"cognitive sensor technologies"**, the institute researches technologies for sensor technology, data transmission technology, data analysis methods and the exploitation of data as part of data-driven services and their accompanying business models. This adds a cognitive component to the function of the conventional "smart" sensor.

More than 1100 employees conduct contract research for industry, the service sector and public authorities. Founded in 1985 in Erlangen, Fraunhofer IIS has now 14 locations in 11 cities: Erlangen (headquarters), Nuremberg, Fürth, Dresden, further in Bamberg, Weischenfeld, Coburg, Würzburg, Ilmenau, Deggendorf and Passau. The budget of 169.9 million euros is mainly financed by projects. 26 percent of the budget is subsidized by federal and state funds.

Detailed information on: www.iis.fraunhofer.de/en