
World's First Photon-Counting CT Scanner Launched



This week, Siemens Healthineers (Erlangen, Germany) launched Naeotom Alpha, the world's first photon-counting computed tomography (CT) scanner, following US and EU regulatory approval for clinical use.

For their role in developing the photon-counting CT scanner, Siemens Healthineers employees, Professor Thomas Flohr, Dr Björn Kreisler, and Dr Stefan Ulzheimer were one of three teams nominated for this year's German Future Award. Awards will be announced later today in Berlin, Germany.

This system represents a transformative change in computed tomography technology. Conventional systems use detectors that measure the total X-ray energy that passes through a patient's body. X-ray photons are converted into visible light via a scintillator layer in the detector. Then photodiode light sensors convert visible light into a digital signal. This two-step conversion process causes X-ray energy information to be lost. In contrast, Siemens's device uses photon-counting technology that directly detects each X-ray photon and its energy level in a single step without information loss.

This provides several advantages over conventional scans because the photon-counting scans contain more useable data. Removing the scintillator layer makes ultra-high-resolution scans possible with more speed and less radiation (up to 45% less). The scanner features a rotation speed of 250 milliseconds and two X-ray tubes and detectors. Thus, the high speed allows imaging without patients having to hold their breath. With less radiation needed per scan, patients can participate in screening programs without exceeding exposure thresholds. The scanner can also natively perform spectral imaging because, with direct digital photon detection, the detectors can differentiate the energy of each photon.

Spectral imaging allows material decomposition based on the chemical elements that make up various materials in the scan. For cardiac imaging, precise imaging is possible inside calcified arteries. Metal blooming artefacts can be automatically removed. Multiple contrast agents can be used concurrently; each contrast can be imaged individually or combined for higher soft-tissue resolution.

Over 20 Naeotom Alpha systems are currently installed in the EU and USA, with over 8.000 patients scanned. GE Healthcare, Samsung, and Philips Healthcare are developing their own versions of the technology.

Source: [Siemens Healthineers – Shape 22 press conference](#), [Press release](#)

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