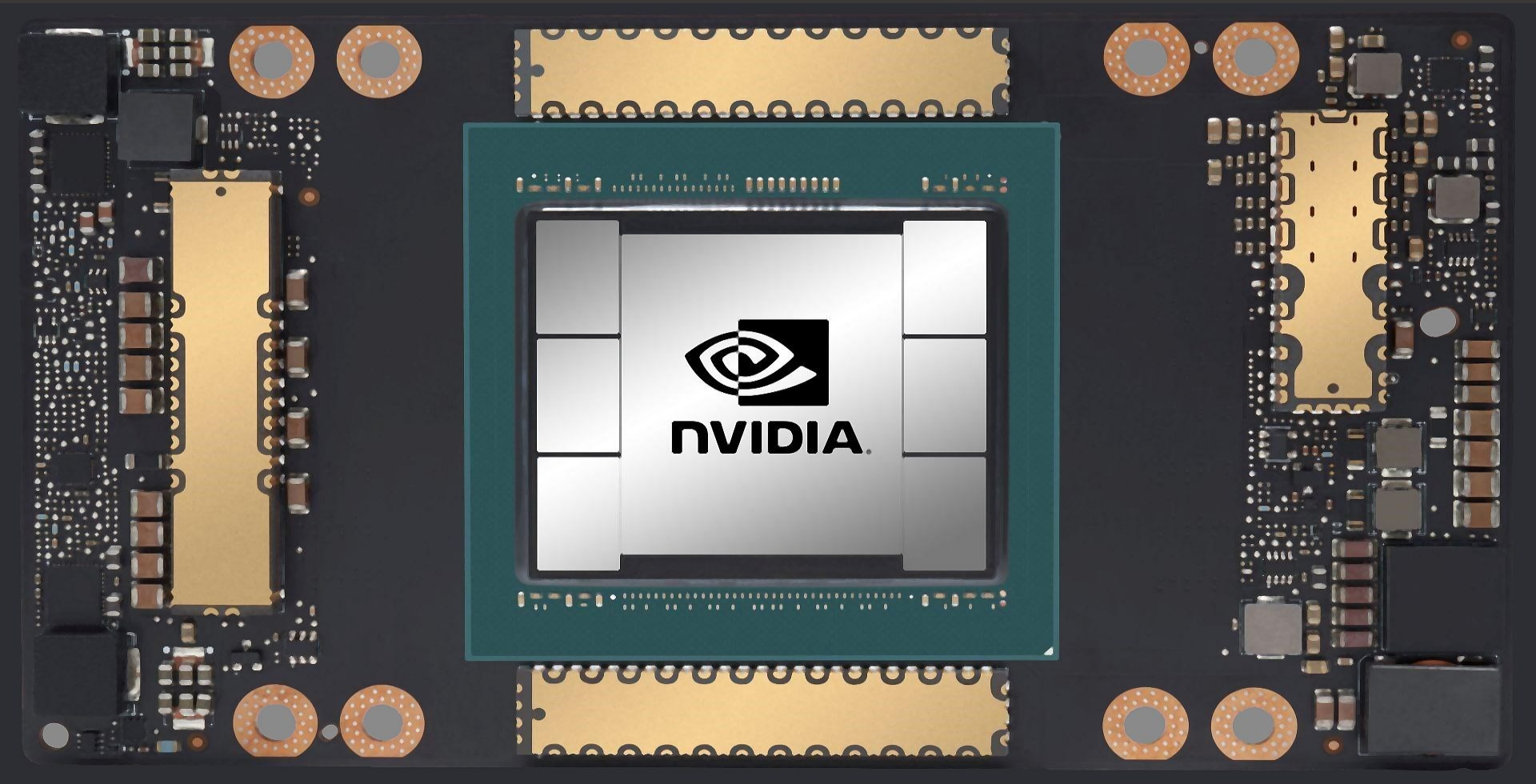
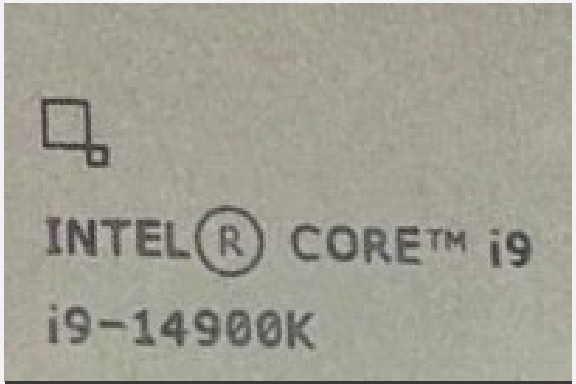
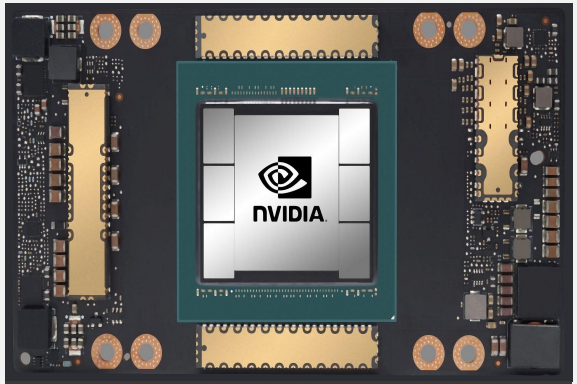

NVIDIA



Core I9 2024, 0.8 TFLOP FP32

Earth Simulator 2002, 40 TFLOP FP 32

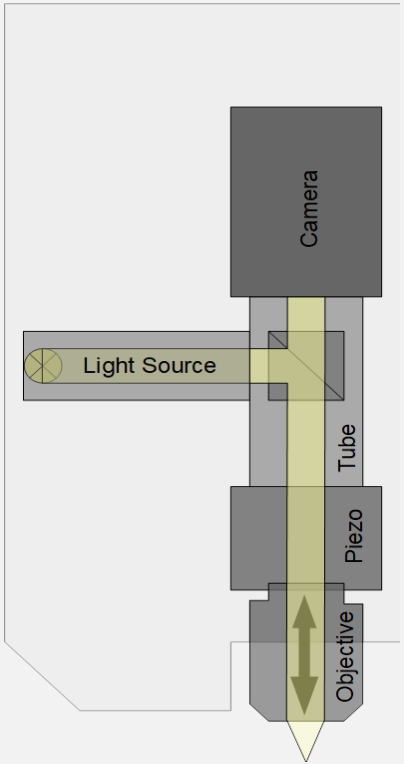


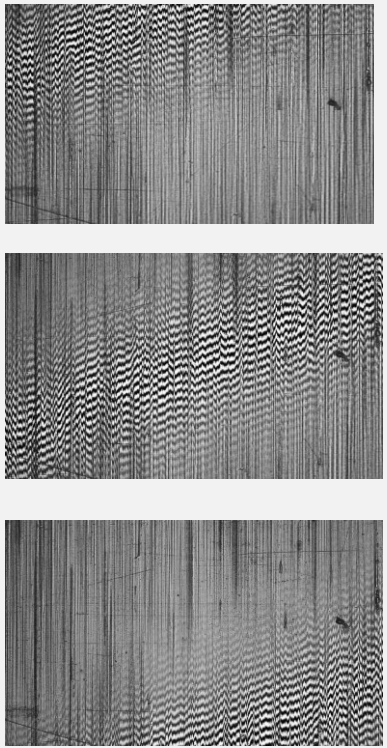
NVIDIA RTX 4090, 82 TFLOP FP 32

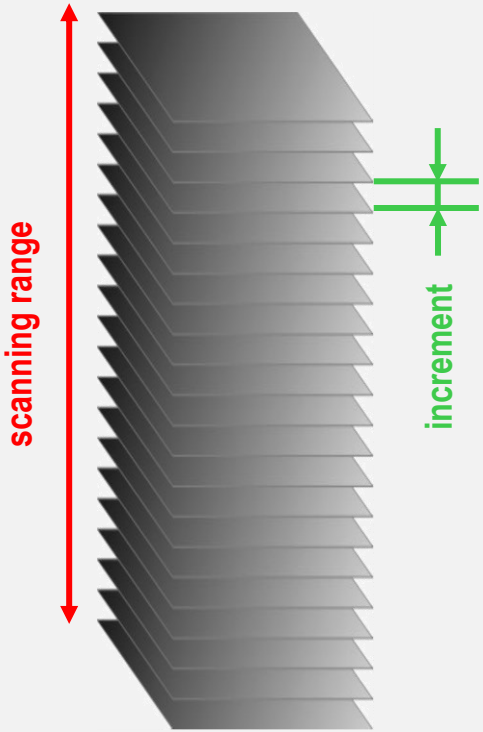
growing power used for optical surface metrology

There are limits to compare a top supercomputer from 2002 and an actual graphic board. The hardware is just optimized for extreme different application. However graphic boards are optimized to process image data and the performance of coherence scanning (white-light) interferometers require the processing of a large amount of image data. The images should visualize the historical progress and the advantage of graphic cards compared to the PC technology. Calculation power which have required complete buildings 20 years ago is now fitting into a PC and a graphic board can process images 100x faster than a PC.

smartWLI image stacks with a large data volume







coherence scanning interferometry

For the data acquisition the interference objective is shifted in z-axis and the camera acquire images to evaluate the interference maxima.

camera:
the camera determines the lateral resolution

scanning range:
each location of the sample must be inside of the scanning range, sloped micro geometries and z-positioning uncertainties requires a larger range

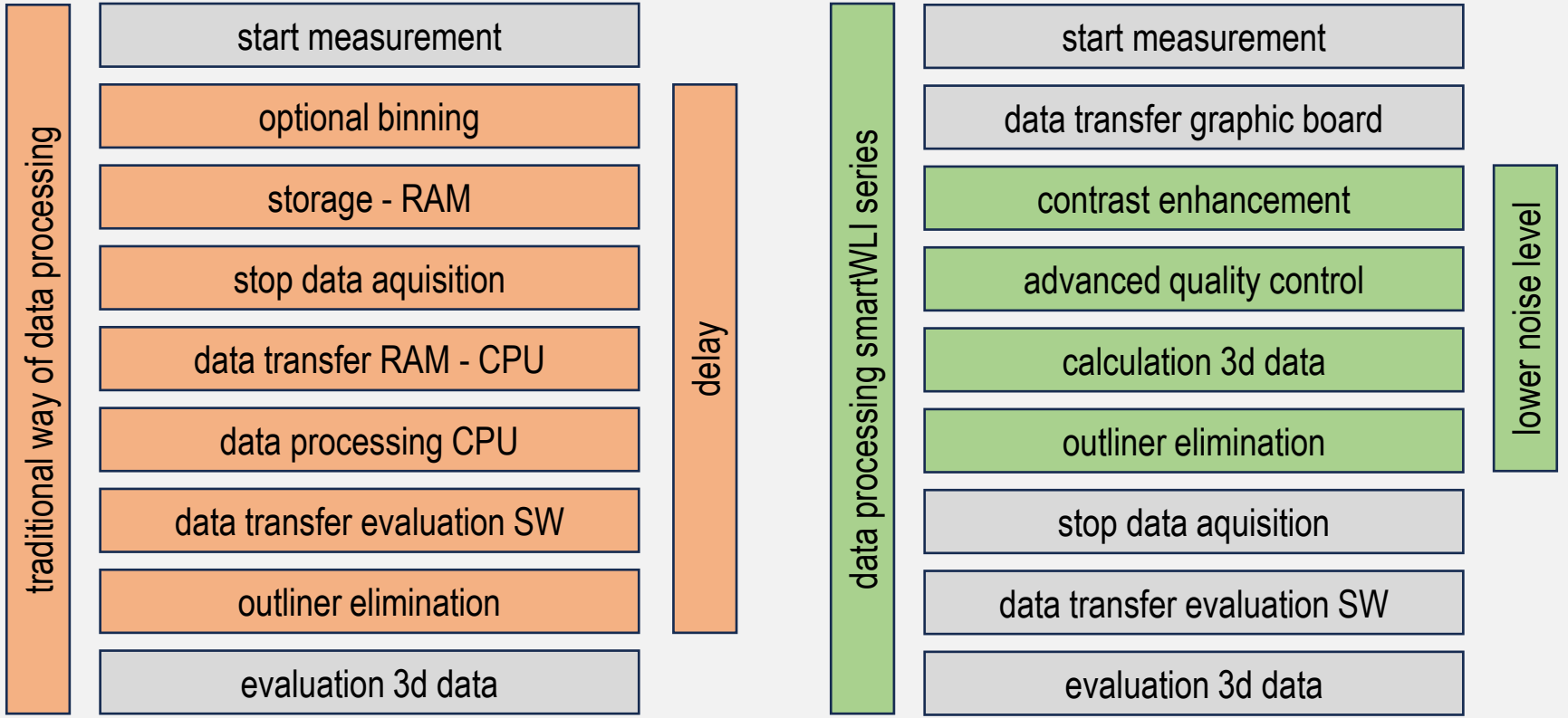
increment:
the increment determine the height resolution

calculation example smartWLI nanoscan:

- 5 MP camera
- scanning range 400 µm
- increment HD-EPSI 15 nm

➢ **data volume: 133 GB**

smartWLI — the new way of the data processing in real time



FASTER CALCULATION OF SURFACE DATA WITH LOWER NOISE

excellent performance for faster measurements with lower noise level:

- the 100x higher calculation power of CUDA programmable NVIDIA graphic boards allows the faster measurement of smaller features with a lower noise level

advantage for extreme smooth and super polished samples

- HD-EPSI allows the use of very small increments
- using small increments more information out of the interference zone can be acquired resulting in a lower noise level
- HD-EPSI is faster than multiple measurements with profile averaging which are additional possible

advantage for data acquisition on sloped flanks with increased acceptance angles

- contrast enhancement allows the evaluation of very weak signals

advantage for measurements of surfaces with multiple reflection and interferences

- advanced quality control analysis signals using FFT based algorithms for each measuring point and eliminate outliners with advantages on fine structured surfaces and small features with a higher aspect ratio