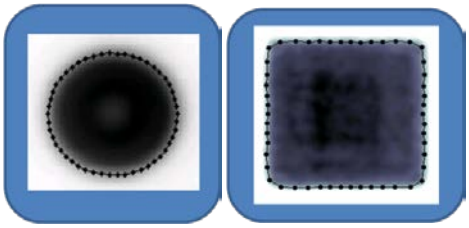
Nova's High-End Imaging System

One of Nova's key core technologies is high-end optical imaging. As part of this specialty, Nova has implemented advanced image processing algorithms, sophisticated navigational channels, and robust pattern recognition capabilities, in its tools.

Advanced image processing for micron-scale characterization

The optical resolution of typical optical microscopes is limited by light diffraction to > 0.5 µm. Nova's advanced image processing algorithms allow for greatly improved precision in characterizing elements with known geometry. For example, it is possible to identify the center point of a square pad with nanometric precision. These capabilities can be used for highly accurate positioning protocols over a small measurement site, assuring repeatable measurements.

This technology is also used in the accurate measurement of Through-Silicon Via (TSV) top CDs, i.e., via dimensions at the wafer surface. Here, typical dimensions range from a few microns to tens of microns, and the measurement precision required is registered in tens of nanometers.

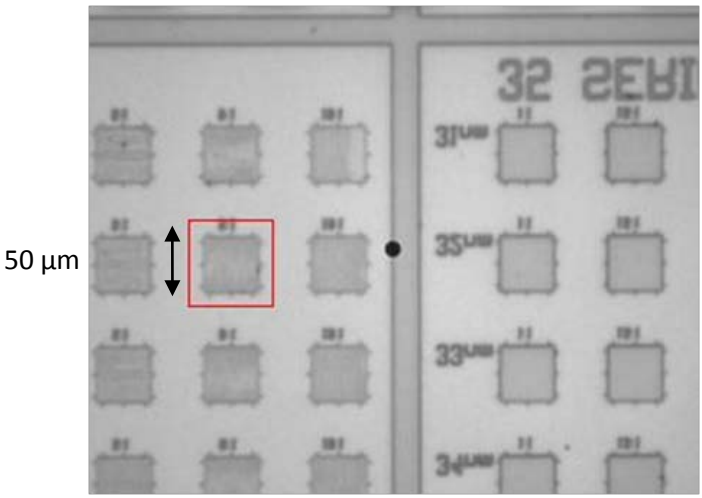


Identification of TSV top CD.

Using in-house developed edge detection algorithms,
Nova tools are capable of identifying top CD values, at a

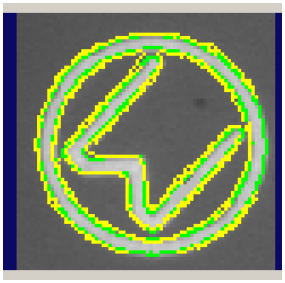
Sophisticated in situ navigation channel

To enable measuring the required location with an accuracy of ~1 µm, the system implements an in situ navigation channel and advanced pattern recognition capabilities.



Robust pattern recognition algorithms

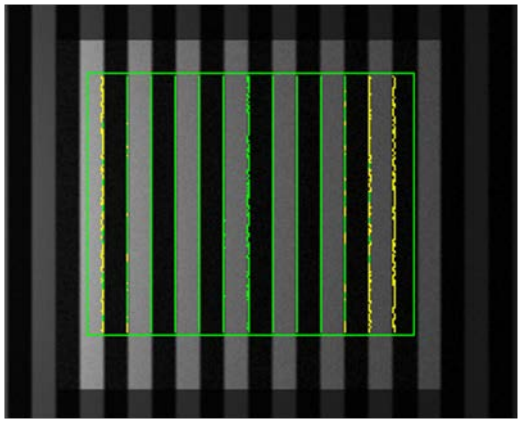
Nova systems utilize advanced pattern recognition algorithms to locate the system position on the wafer. These algorithms utilize a geometrical concept that creates a model of the feature's geometry.



Such algorithms enable tenth of a pixel accuracy with a speed of just a few milliseconds per image.

Nova's pattern recognition method provides the following advantages:

- Utilizing a geometrical concept decreases sensitivity to contrast variations in the frame. The matching is calculated according to the geometrical properties of the feature, and not according to the grey level of the edges.



Contrast changes do not affect the score

- Increased sensitivity to fine elements in the feature increase the uniqueness of the matching results.