Nova i570® HP

Highest Performance Integrated Metrology Solution

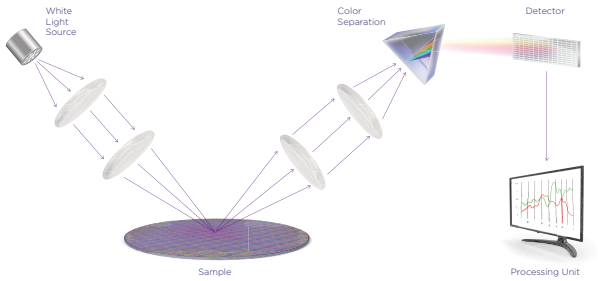


The Fastest Tool in the Market

Nova i570® HP is Nova's most advanced integrated metrology platform and the leading member of the Nova i570® product family. It provides the highest metrology performance, process control, and productivity capabilities for R&D and high-volume manufacturing in the most advanced logic and memory process nodes.

The platform offers extensive spectral information, the smallest pad size, and cutting-edge pattern recognition and enables enhanced within-wafer/within-die variation control by measuring more sites and pre- and post-wafer measurements.

Equipped with Nova's advanced modeling and algorithmic software solutions, Nova i570® HP significantly improves metrology accuracy, precision, and tool-matching capabilities.



Advantages of Optical Scatterometry

- High measurement speed due to strong light sources and sensitive detectors
- Nondestructive with no impact on the production line
- Interpretation of the scattered signal is much more accurate than with other metrology technologies

Highlights and Benefits

Highest throughput
Brings significant improvement in wafers per hour to increase customer sampling, and attaches to the industry's fastest CMP polishers

Superior variation control
Enables control of every wafer, and measures within-wafer and within-die information

Highest accuracy
Demonstrates higher accuracy compared to previous generations, and offers best-in-class precision and tool-to-tool performance for leading-edge technology nodes

Compatible with Nova i550®
Fully backward compatible with the Nova i550® platform

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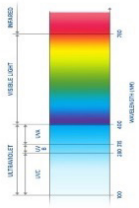
Nova i570HP Key Capabilities and Benefits

Measurement

Enhanced metrology performance

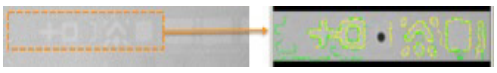
- LDLS for better SNR with 30%-50% precision improvement
- Extended WL range (DUV)
- Minimum Pad-Size



Location Arrival

Navigation Accuracy

- Improved system navigation
- improved pattern recognition capabilities
  - Multi wavelength filtering HW
  - New filter allows coverage of Poly layers and high thickness layers for CIS
- PR-Less mode, better position accuracy



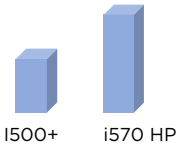
Productivity Tools

TPT Improvement

- Significant TPT improvement 20% WPH over i550
  - Support new, faster polishers
  - Allow better WIW control by measure more sites

Reliability

- Longer lamp life
- Latest Security



Modeling

- Improved Integrated Metrology accuracy

Nova Integrated Metrology Solutions Value Proposition

- Enabler for in-die measurement
- Best sensitivity
- Sub A level precision
- Standalone level accuracy
- Smallest pad size

- In die measurement – robust to underlayer process variation
- Combination of physical and model-less solution
- Tighter T2T spec and superb accuracy
- Automatic recipe monitoring and re-train capabilities



- Best CoO / fastest TPT
- Support fastest TPT polishers
- High sampling Pre & post
- Best T2T
- Automatic recipe creation
- Reference reduction

- Accurate model-based solution
- Fast adaptation to CIP changes (<1day)
- Eliminate the need to measure on SA and IM for training set

Nova Prism 2

A New Dimension in Optical CD



Unique Information for Critical Applications

Nova introduces Prism 2, a high-end Optical CD platform employing a unique Spectral Interferometry (SI) information channel, designed to deliver comprehensive metrology solutions for the most advanced memory and logic technology nodes and unique packaging metrology challenges

Highlights and Benefits

Application Performance
Robustness within a tight process window, addressing the most complex applications

Powerful Hardware
An all-new platform designed from the ground up based on most recent HW advancements in optical design and throughput for high productivity

Essential Information
Inaccessible by alternative solutions

Industry-leading
machine learning solutions, and a cohesive synergy of hardware and advanced algorithms

Future-Ready
The modular design and unique SI optical path support future innovation, extendibility, and improvements.

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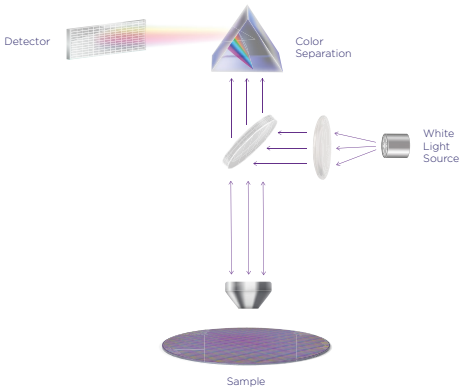
Why Nova Prism?

Nova Prism 2 combines state-of-the-art multi-channel Spectral Reflectometry and Ellipsometry (SR/SE) with revolutionary Spectral Interferometry (SI) in a novel combination to extend metrology capabilities beyond traditional OCD. The unique optical SI channel provides access to new spectral information inaccessible by alternative techniques.

The exclusive data measured by Nova Prism 2 allows improved sensitivity and accuracy required to address R&D and HVM metrology needs of advanced process nodes.

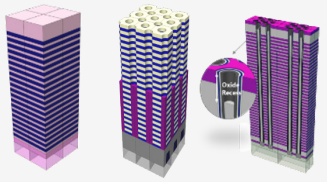
Nova MARS® physical modeling solutions and Nova Fit® machine learning algorithms further enhances Nova Prism 2 metrology performance and productivity to unmatched levels for multiple challenging applications.



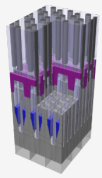
Advantages of Spectral Interferometry

- **New sensitivities:** Broadband complex wavefront information, carrying unique sensitivities and unique decorrelation capabilities
- **High-end metrology:** Robust, high-accuracy, and high-precision
- **Closer to the process:** Improved correlation to device yield across critical steps

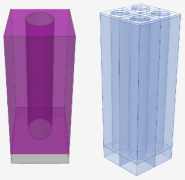
Key Application Challenges Addressed by Nova Prism



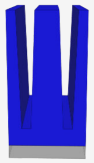
3D NAND



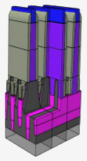
DRAM
Active area to capacitors



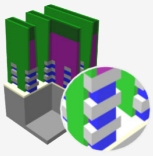
TSV Module



Deep Trenches Plasma Dicing



FinFET



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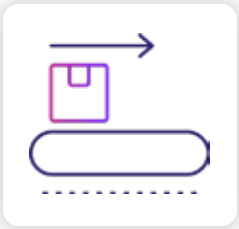
Nova VeloCD®

Optical CD platform for high productivity and high-performance metrology



Outstanding Versatility & Performance



Nova VeloCD® is an advanced, standalone dimensional metrology platform, optimized for high productivity in a wide range of Logic and Memory applications. It features state-of-the-art metrology and handling hardware, together with a suite of advanced modeling and machine learning algorithms, to offer optimal metrology performance.

Highlights and Benefits

Smart Multi Channel Metrology
Combines Spectral Ellipsometry with Spectral Reflectometry and algorithm driven channel optimization to deliver highly accurate, high productivity measurements for advanced 2D and 3D structures.

Unmatched Throughput
A single measurement unit (base) provides high throughput while with a dual MU configuration it delivers best-in-class throughput for high sampling rates.

High Availability
A low-maintenance, high-brightness light source, combined with a highly robust handling system, improves uptime while lowering the frequency of platform maintenance and associated costs.

Enhanced Metrology
An extended wavelength range with improved SNR enables high-precision metrology with improved budget time and repeatability.

Industry Leading ML
Comprehensive advanced modeling tools enable a shorter time to solution (in hours) and provide precise and accurate metrology with Stack-maker and Nova Swift.

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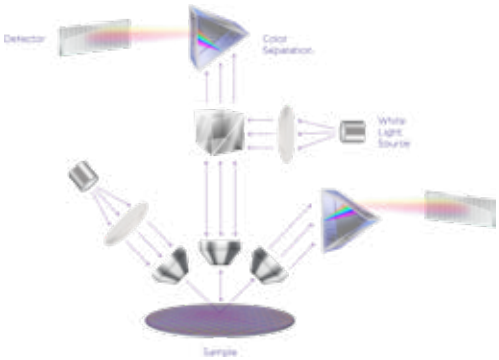
Why Nova VeloCD®?

The Nova VeloCD® is a cutting-edge standalone dimensional metrology platform designed for Advanced Logic and Memory applications. It integrates advanced metrology and handling hardware with sophisticated modeling and machine learning algorithms, ensuring optimal performance.

Key features include a low-maintenance bright light source for high availability, and an extended wavelength range for enhanced precision. While a single measurement unit (MU) is the base configuration, an optional dual MU configuration enables to maintain high throughput for multi-site measurement requirements. Finally, Nova VeloCD® offers industry-leading machine learning modeling tools that significantly reduce the time to solution and enable precise and reliable metrology.



Advantages of Optical Scatterometry

- High measurement speed due to powerful light sources and sensitive detectors
- Nondestructive with no impact on the production line sample
- Interpretation of the scattered signal is significantly more accurate compared with other metrology technologies

Dual MU Configuration

Nova VeloCD® offers an option for dual parallel measurement unit configuration for high sampling applications, allowing customers to double the throughput and maintain high productivity rates.



Nova VeloCD® Application Domain



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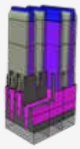
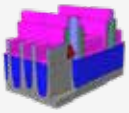
Critical NS POIs



FinFET
All HVM layers



DRAM
from Active area to capacitors



TF on structure



BE Etch



CMP
Complex apps

Nova WMC®

Next Generation Modular Optical Metrology Platform for Advanced Packaging



Outstanding Versatility & Performance

Nova WMC® is a high-end optical metrology platform designed to support 2.5D and 3D Advanced Packaging processes. Its advanced metrology, handling, and loading systems' highly versatile modularity combines precision, accuracy, and high throughput for outstanding performance at an unmatched Cost of Ownership.

Highlight and Benefits

Powerful Metrology

A multi-sensor metrology system supporting a wide range of applications

Outstanding Performance

Combines precision, accuracy, and high TPT through state-of-the-art hardware

Versatile Handling

Optimized for different wafer sizes, framed wafers, and panels in Advanced Packaging scenarios

Automated Workflows

Offers unique software scripting for automated measurement workflows

Future Ready

Advanced metrology and flexible architecture enable scalable, in-field upgrade solutions

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Why Nova WMC®?

Nova WMC® is a high-performance optical metrology platform engineered for advanced 2.5D/3D packaging and HBM applications. It integrates proprietary multi-sensor technologies—including interferometry and reflectometry—with adaptive focus for precise, repeatable measurements on warped or non-uniform surfaces. Its modular architecture supports a wide range of wafer sizes and handling configurations, while SEMI-compliant automation ensures seamless fab integration. With scalable performance and in-field upgradeability, Nova WMC® delivers robust, future-ready metrology for the most demanding semiconductor packaging



Multi-Sensor Metrology

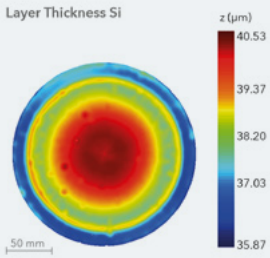
WMC® delivers highly precise and reliable measurements for a wide range of applications on a single tool, leveraging advanced methods such as Spectral Coherence Interferometry, White Light Interferometry, Spectral Reflectometry, and Optical Microscopy.



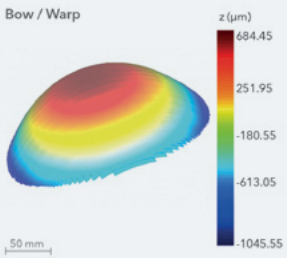
Versatile Handling Support

Wafer sizes: 150-300mm, framed wafers, and panels.
Load port configurations: FOUP, SMIF, and open cassette systems.
End effectors: including vacuum, edge-grip, and dual-arm designs tailored for different handling needs.

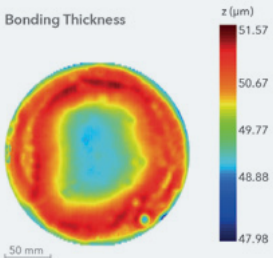
Key Applications



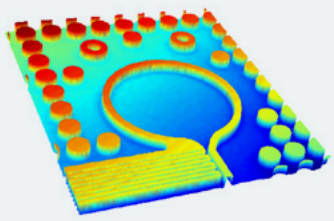
Backside Silicon Thickness
2.5D/3D | HBM



Wafer Warpage
2.5D/3D | HBM | W2W Bonding



Bonding Layer TTV
Temporary Bonding



Topography Analysis
RDL