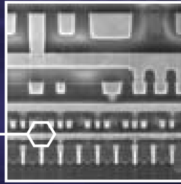
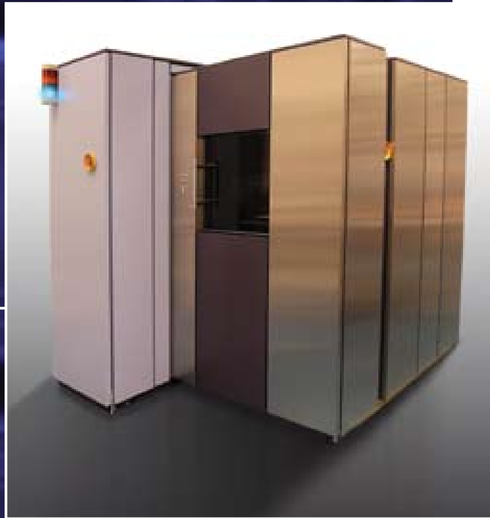
ANY WAY YOU LOOK AT IT,
FEI PROVIDES THE WORLD'S BEST VIEW.



Full-Wafer DualBeam™ Family

Industry-Leading Root-Cause Analysis and Process Development



See the most accurate picture of your process

As device geometries continue to shrink, high-resolution analytical capabilities are essential to win the race to volume. Your lab needs the most productive and accurate defect-characterization tools to address the demands for increased control and improved yield. Choosing a full-wafer solution means recognizing the vast benefits your lab can leverage from not breaking production wafers in order to do high-end analysis. Drastically reduced time to answer, reduced cost of ownership, improved cross-section throughput and the most efficient analysis are at your fingertips with FEI's Full-Wafer DualBeam family. Featuring the Expida™ 1255 300 mm DualBeam (FIB/SEM) and Altura 855™ 200 mm DualBeam (FIB/SEM), the Full-Wafer DualBeam family is truly the ultimate solution. Uniquely able to achieve the highest-possible performance for three-dimensional defect characterization and root-cause analysis, these full-wafer solutions provide the most accurate picture of your process, leading to productivity and faster turnaround time for your fab-support lab.

RIGHT Right the first time

FIRST First to market

FAST Fast to volume

Enjoy these key features and benefits across the family:

- *Rapid time to data and root-cause analysis for yield excursion recovery*
- *Turnkey defect navigation using defect files received from optical/SEM-based detection and review tools*
- *Superior low-magnification imaging for defect navigation on unpatterned wafers*
- *High-throughput TEM sample preparation with optional in-situ lift-out capabilities*
- *Analysis of subsurface structures made visible by FIB cross-sectioning*

Applications:

Failure Analysis

- Cross section
- Ultra hi-res FIB milling and imaging
- HR-SEM imaging
- General purpose SEM imaging
- Low damage TEM sample preparation
- EMI active cancellation
- Wafer to TEM grid sample extraction
- TEM prep automation
- X-Ray analysis
- CAD navigation
- Metal deposition
- Metal etch
- Dielectric etch
- Dielectric deposition

Circuit Edit

- Front-side edits
- Ultra-high accuracy feature relocation

⬢ Standard
⬡ Optional

Enjoy the benefits of a full-wafer solution

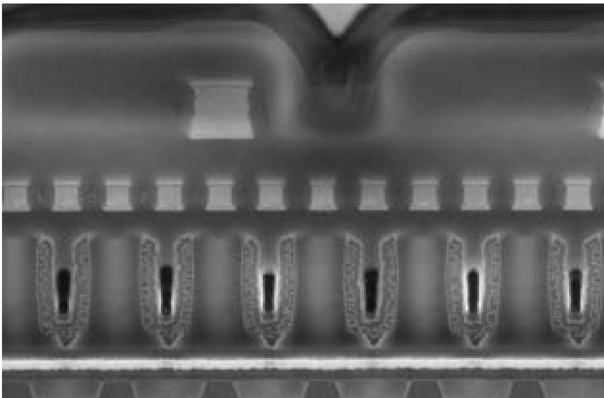
The Full-Wafer DualBeam family features solutions that partial-wafer tools simply can't provide. Streamlined cross-section analysis on full wafers takes a fraction of the time needed when breaking the wafer. In fact, both the Altura and Expida series utilize the highest-accuracy, five-axis stages available to effectively and confidently navigate to defect locations. The Altura features a 200 mm stage, offering a cost-effective and reliable solution for root-cause analysis. The Expida stage accommodates 300 mm wafers and delivers ultimate performance, navigating directly to defect locations at speeds up to 100 mm per second. Both use FEI's most advanced ion and electron columns, plus a powerful combination of defect navigation, cross-section preparation and data-collection capabilities. FEI's Full-Wafer DualBeam family ensures you get the most accurate data in the shortest time possible, allowing you to enjoy reduced cost of ownership and new levels of productivity.

An integrated, versatile toolset

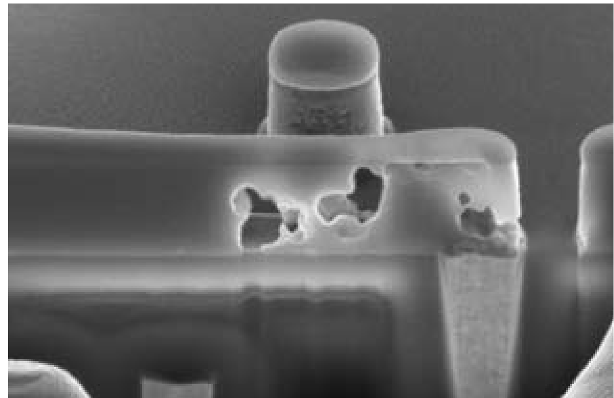
With high-resolution scanning electron microscope (SEM) imaging, complemented by accurate and fast focused ion beam (FIB) milling, both the Altura and Expida are DualBeam solutions that can easily and efficiently investigate below the surface to reveal buried defects, process anomalies and device failures. The Sirion™ SEM column delivers optimized, low-voltage operation (1 kV and below) without sacrificing performance at higher voltages. And higher angular intensity and a more finely controlled spot size ensure superior low-magnification capabilities on bare wafers for defect navigation, as well as better imaging on charging materials such as low-k dielectrics. The Sidewinder FIB column enables faster milling and transmission electron microscope (TEM) sample preparation, plus consistent performance throughout the entire voltage range (5-30 kV). The Full-Wafer family's DualBeam capabilities deliver fast, versatile solutions to see buried defects conventional defect-review SEMs can't.

Product	Electron Image Resolution	Ion Beam Resolution	Ion Beam Current	Stage Speed
Expida 1255	3 nm (1-30 kV)	7 nm (5 nm achievable)	1 pA – 20 nA	100 mm/sec
Altura 855	3 nm (1-30 kV)	7 nm (5 nm achievable)	1 pA – 20 nA	10 mm/sec

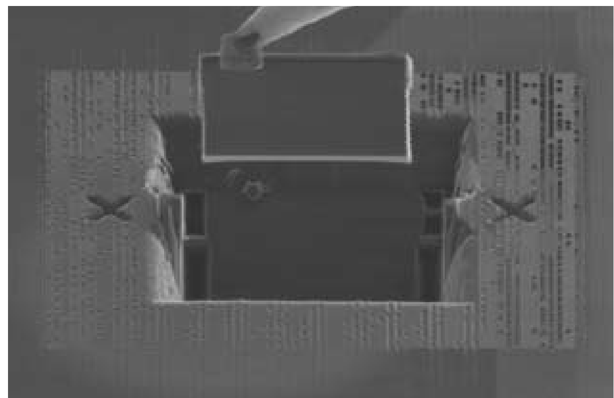
Product	Maximum Wafer Size	Parts Holder Compatibility	Lift-out Capabilities
Expida 1255	300 mm	Yes	FEI NanoLift™
Altura 855	200 mm	Yes	Omniprobe



A full-wafer DualBeam will allow you to rapidly see your process in 3D across your wafer to help you make critical decisions that will speed process development and ramp times.



Use the powerful combination of SEM and FIB columns to get images showing defect root cause that you could not get from conventional single-beam tools.



TEM sample creation for in-situ or ex-situ lift-out is available standard on all FEI's full-wafer tools. Automation software for thinning of multiple sites is also available.

Both the Expida and Altura series feature high-speed beam chemistries to further extend the capabilities of the system. A wide range of gases, in addition to conductor- and insulator-deposition materials, allow localized deprocessing and in-situ delineation of cross-section faces. Multiple retractable needles provide safety, rapid switching times and ease of application. In particular, FEI's Delineation Etch™ reveals oxides and other layers within a cross-section. You save time by eliminating the need for wet chemical etches outside the system before acquiring the final SEM image that solves your problem.

The Full-Wafer DualBeam family can be configured to automate routine processes and procedures, allowing you to increase the accuracy of the collected information and further enhance lab efficiency. FEI software enables unattended preparation of multiple TEM specimens across the entire wafer surface easily and reliably. You get higher throughput and more precise TEM sample preparation than you can get by breaking the wafer – and much more accuracy than mechanical methods.

Linking fabs to labs

An additional feature of the Expida series is compatibility with FEI UltraView™ analysis and diagnostics process, a complete sample transfer and analysis suite that allows near-fab labs to provide rapid, ultra-high-resolution STEM and atomic-level TEM imaging and analysis. The key component of this process on the Expida DualBeam is the FEI NanoLift™, an in-situ sample lift-out, load-lock and transport mechanism used for transferring cartridges containing multiple TEM samples. As many as six samples can be transferred to a grid and placed in a single capsule for auto-loading from the Expida. Process data that once took days to access is now available in a matter of hours.

Superior products from a superior supplier

As the provider of the world's best characterization, process-control, failure-analysis and device-diagnostics solutions available, FEI is committed to providing reliable, superior solutions that translate into an exceptional return on your technology investments. The performance advantages you receive from products such as the Expida and Altura series secure long-life solutions that are extensible through the next several technology nodes, ensuring your technology investment is secure. A partnership with FEI means enjoying the peace of mind that comes from our long history of leading the industry with products that provide the highest-quality characterization, analytic and metrology data in the shortest amount of time. FEI remains the only company offering the range of products necessary to address all of the imaging and sample-preparation needs of today's semiconductor lab. Now and in the future, you can count on FEI to provide the most innovative, cost-effective solutions available for cross-sectional imaging and sample preparation. Wherever you are on your technology roadmap, FEI remains committed to helping you get designs right the first time, get to market first and arrive at full production fast.

See more at **www.fei.com**.

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TOOLS FOR NANOTECH

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