

PRESS RELEASE

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Multibeam Patent Pioneers Parallel Wafer Inspection Plus Defect Review Using Single Tool

Innovative multicolumn platform adds direct inspection from design layout database

SANTA CLARA, CA - Oct. 31, 2016 - Multibeam Corporation today announced the expansion of its e-beam patent portfolio with innovations that significantly improve wafer inspection and defect review using a single tool. The new patent underscores the company's leadership in developing a high-throughput e-beam platform that concurrently enables four major applications: Complementary E-Beam Lithography (CEBL) to reduce litho cost; Direct Electron Writing (DEW) to enhance device security; Direct Deposition/Etch (DDE) for highly localized precision etch and deposition using directed electron activation; and E-Beam Inspection (EBI) to speed defect detection and yield ramp.

Patent #9,466,463

The patent announced today details a unique single-tool approach that combines direct inspection using a design layout database with high-resolution defect review.

By first identifying care areas, or potential hot spots, using the design layout database or other external inputs, the single tool performs parallel, high-speed, wafer inspection at low resolution to identify areas with at least one potential defect for further review. The system then vectors to the defect areas for high-resolution imaging, analysis, and classification.

Multibeam's multicolumn charged particle beam array images multiple hot spots in parallel and classifies potential defects. Significantly, this invention extends the capabilities of the company's versatile multicolumn e-beam platform by leveraging two key attributes: precision raster scan of electrons on the wafer to produce images, and multicolumn parallel processing to increase throughput of imaging, analysis, and classification.

The new patent builds on four patents that were granted to Multibeam last year. These earlier patents encompassed integrated EBI with feedforward as well as feedback loops and die-to-database comparison to accelerate yield ramp.

While Multibeam's multicolumn EBI can be used as a conventional standalone system to boost throughput with parallel inspection, it can also be integrated in-line (e.g., CEBL – Etch – EBI) to reduce cost and increase yield.

Industry Trends

According to David K. Lam, Multibeam Chairman, two major processing trends are coming into focus: first, electrons will increasingly complement photons due to shrinking feature size; and second, process integration will play an even more crucial role to achieve productivity and capability levels beyond the reach of standalone equipment deployment. He confirmed that Multibeam is focused on providing solutions that support these trends.

About Multibeam

Multibeam Corporation is a leading electron-beam technology innovator. With 38 patents filed, 26 issued, the Silicon Valley pacesetter focuses on developing multicolumn e-beam systems and platforms for four major applications: Complementary E-Beam Lithography (CEBL), Direct Electron Writing (DEW), Direct Deposition/Etch (DDE), and E-Beam Inspection (EBI).

Multibeam Pilot™ CEBL Systems work in a hybrid mode with 193nm ArF immersion (193i) lithography to pattern cuts (of lines in "lines-and-cuts" layout) and holes (i.e., contacts and vias) with no masks. Pilot™ CEBL complements 193i and eliminates the soaring costs associated with optical multi-patterning in the manufacture of advanced ICs. Further, because Pilot™ CEBL is followed by Etch, the CEBL-Etch sequence can seamlessly incorporate multicolumn EBI. With feedback and feedforward as well as die-to-database comparison, the CEBL-Etch-EBI integrated process greatly accelerates yield ramp.

Multibeam ChipLock™ DEW Systems embed security information in each IC including chip ID, MAC address, and private key encryption. The chip ID guards against counterfeiting and enables supply chain traceability while encryption keys are crucial in authenticating software. IC-embedded security complements software security and extends from IoT to other ICs that populate automobiles, power grids, manufacturing plants, communication networks, financial and banking networks, transportation networks, and other critical infrastructure.

Based in Santa Clara, California, Multibeam is led by Dr. David K. Lam, the founder and first CEO of Lam Research who successfully guided the development and market penetration of his eponymous company's first fully automated plasma etch system. Widely recognized as a key contributor to the growth of the semiconductor industry, Dr. Lam was inducted into the Silicon Valley Engineering Hall of Fame in 2013.

For more information, visit www.multibeamcorp.com.