Breaking Through Barriers

Puma 9000 Offers High-Sensitivity Inspection Without Compromising Throughput

At < 65 nm nodes, chipmakers face the continued introduction of new processes and new materials, along with unrelenting pressure for cost-effective manufacturing. To address these industry challenges, KLA-Tencor offers the Puma 9000 family, our next-generation darkfield technology.

Designed to enable cost-optimized patterned wafer inspection, Puma 9000 provides high sensitivity at production-worthy throughput levels to enable detection of critical, yield-impacting defects on various layers. The core enabler of this tool is Streak™ technology.

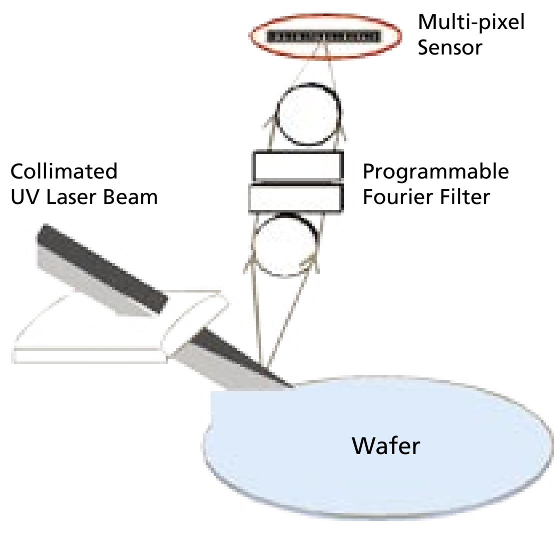
Streak technology brings new life to traditional darkfield technology. Resolution in traditional darkfield technology is directly related to the illumination spot size. Shrinking design rules have forced the migration to smaller spot sizes to gain resolution; however, this puts the brakes on throughput. In addition, traditional darkfield technology relies on a photo multiplier tube (PMT) and an acoustic optical device, which has a data rate limitation of about 300 megapixels per second. These inevitable limits in throughput and detection capacity drove an innovation in technology to extend the production-worthy line monitoring capabilities of darkfield systems. Streak technology is the unique combination of illumination orientation, collection, and a multi-pixel sensor design that allows the Puma 9000 to achieve extremely high data rates and smaller pixels sizes.

The increased resolution extends the tool's capabilities beyond traditional laser scattering applications, supporting a mix-and-match approach with KLA-Tencor's brightfield tools that enables higher sampling rates to protect more wafers in progress. Its programmable Fourier filter increases sensitivity in array regions of the wafer, suppressing diffraction pattern noise. The tool also shares a common software platform and recipe components with the 23XX brightfield tools, as well as with KLA-Tencor's eS3X family of electron-beam inspection solutions. Such commonality facilitates a cost-effective patterned wafer inspection strategy, and supports rapid integration into the production environment.

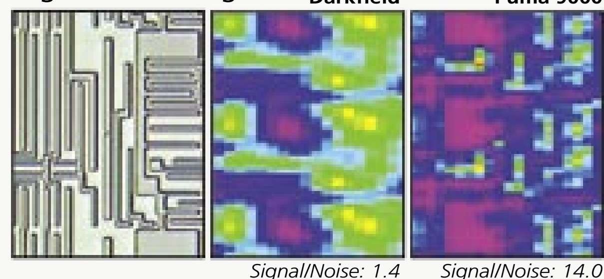
The Puma 9000 also enables:

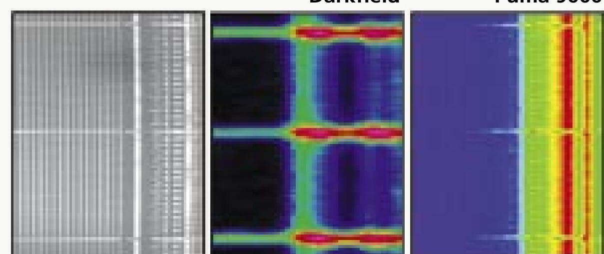
- Higher sensitivity to critical defect types with Streak technology
- High throughput at required sensitivity for advanced design rules
- Lower training burden and faster implementation inline due to common platform with 23XX and eS3X
- Fast yield learning with real-time defect classification through integrated inline automatic defect classification (iADC)
- Support for specific application needs through flexible configurations
- Capital extension through an extendible architecture

Streak Technology: Breaking Through the Throughput Barrier



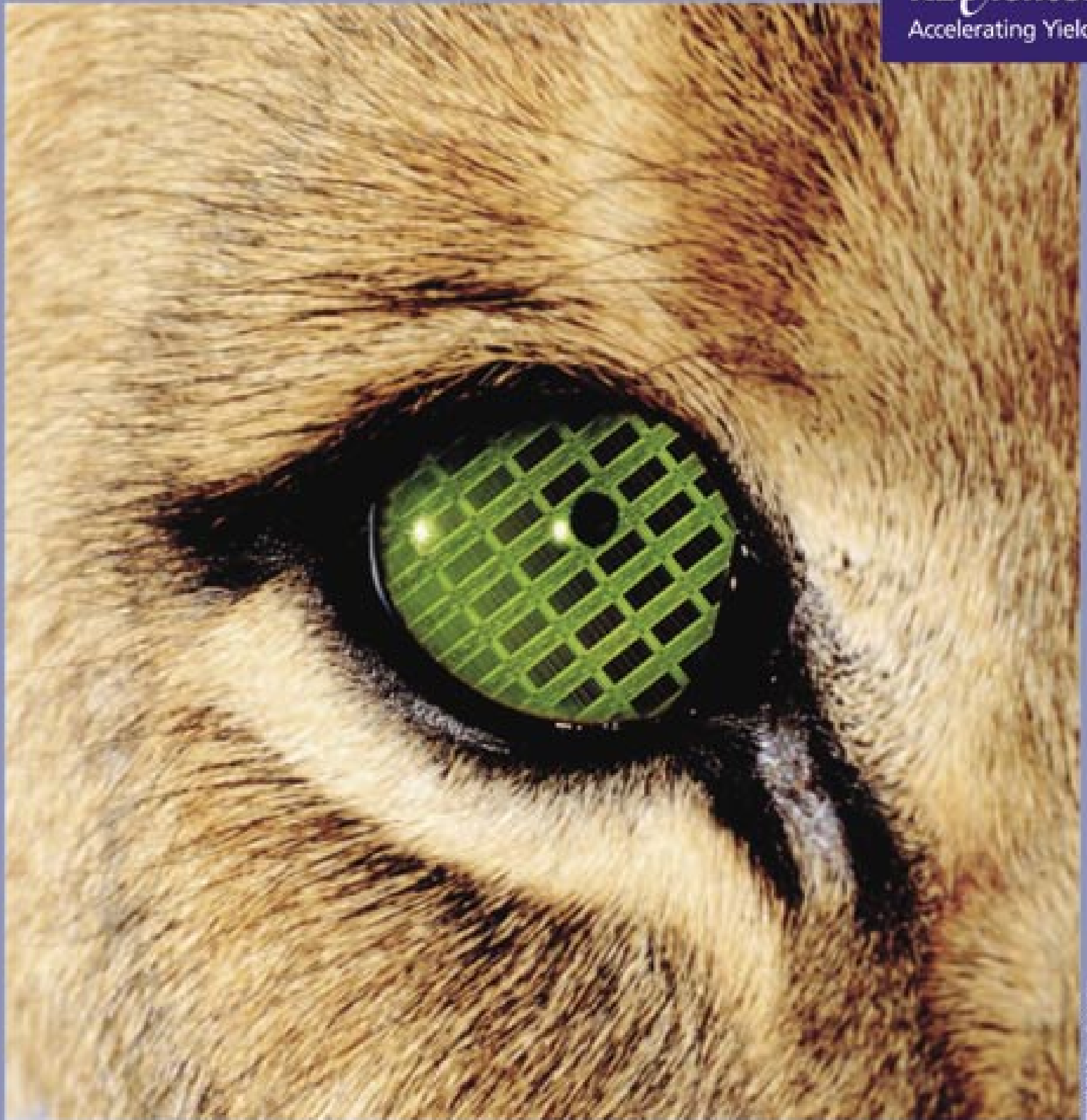
KLA-Tencor's innovative Streak technology enables the Puma 9000 to provide high sensitivity at optimal throughput.





This series of images depicts a logic device (top) and a DRAM device (bottom) as viewed through a traditional darkfield inspection tool and the Puma 9000. Enhanced signal-to-noise and improved resolution on Puma 9000 enable better defect capture on both devices.

KLA-Tencor
Accelerating Yield®



Puma™ 9000

An entirely new animal in optical defect inspection.

By combining scattering physics with imaging technology, Puma changes the way you inspect. It's the new innovation in optical inspection. With Streak™ technology, Puma addresses the resolution, throughput and extendibility requirements of 65-nm design rules and beyond.

- Superior resolution at high throughput enables cost-optimized patterned wafer inspection strategies
- Extendible architecture protects capital investment
- Fast integration into high-volume production, leveraging commonality with KLA-Tencor's 23xx inspection family
- For product data and technical papers, go to:

www.kla-tencor.com/Puma