Lightmatter Unveils Guide DR: Industry First Liquid-Cooled Laser NIC that Quadruples Rack Density

May 21, 2026

Designed for OCP compatibility, new in-chassis light engine eliminates faceplate bottleneck, powering up to 51.2 Tbps of optical bandwidth for AI scale-up

MOUNTAIN VIEW, Calif. – May 21, 2026 – Lightmatter, the leader in photonic (super)computing, today announced Guide® DR, a high-density laser in an innovative Laser Network Interface Card ("LNIC") form factor built to OCP NIC 3.0 dimensions. The Guide DR LNIC is a modular, high-density laser array that enables approximately four times the rack density of conventional External Laser Small Form Factor Pluggables (ELSFPs). By relocating the light source from the faceplate into the chassis, the Guide DR LNIC solves the faceplate scaling bottleneck while leveraging existing liquid cooling infrastructure. Guide DR was specifically designed to support Passage® L20 and other high-bandwidth optical interconnects. This provides AI factories the integration flexibility and performance required to drive scale-up clusters to one thousand XPUs and beyond.

As scale-up domains grow, the front panel of every switch and compute tray becomes contested real estate. Each successive accelerator and switch generation increases bandwidth and I/O port count, straining the tray's physical envelope. Compounding increases in laser power, cooling load, and fiber count can more than double the required number of rack units when using conventional lasers. Guide DR offers a new scaling paradigm. A single LNIC packs dozens of lasers into a liquid-cooled, in-chassis module sized to OCP NIC 3.0 dimensions with industry-standard, pluggable fiber connectors at the output. This concentration of optical power is designed to drive up to 51.2 Tbps of aggregate CPO or NPO scale-up bandwidth. By utilizing four Guide DR modules, a single 1 RU switch tray can support up to 204.8 Tbps of CPO scale-up switching bandwidth—eliminating the need for a larger 4 RU chassis populated with liquid cooled ELSFP lasers.

"With Guide DR, we are removing the physical barriers to next-generation AI infrastructure by delivering the foundational laser innovation required to scale co-packaged optics," said Nick Harris, Ph.D., Founder and CEO of Lightmatter. "As the industry scales from 200G ports to beyond, traditional light source solutions are hitting a wall. By integrating a high-density, liquid-cooled light source into a standard NIC form factor within the chassis, we unlock the massive optical power necessary for next-generation interconnects in a single 1 RU footprint. This architecture enables the system-level reliability hyperscale operators require, while maintaining the modularity the industry expects."

"The semiconductor industry has reached a point where AI is driving a new class of compute infrastructure with needs well beyond GPUs and ASICs. As hyperscalers build larger and faster AI facilities, front-panel pluggable external lasers will soon become a major bottleneck," said Christopher Taylor, Director at TechInsights. "Lightmatter's transition to a compact, internal Laser NIC design marks a key architectural shift, boosting optical power and interconnect bandwidth while maintaining datacenter physical efficiency."

Unmatched Density and Scalability
Key specifications of the new light engine include:

- **High-Density Optical Power:** Each compact module supplies 200 mW of optical power per fiber across up to 64 fibers to drive 256 lanes at 200G each.
- **Zero Faceplate Footprint:** The compact form factor is designed for implementation inside OCP MHS/MGX system trays and requires zero front-panel real estate.
- **Flexibility:** The LNIC module matches the physical dimensions required to flexibly mount into standard OCP NIC 3.0 trays or alternative locations, maximizing operational efficiency.
- **Massive Bandwidth Scaling:** The modular architecture accommodates up to 4 Guide DR modules supporting scale-up bandwidth of over 200 Tbps in a 1RU switch tray.
- **Advanced Control and Telemetry:** CMIS 5.3 compliant with I2C/I3C control interfaces, providing comprehensive telemetry for internal temperatures and laser diode drive current.
- **Thermal Efficiency:** Optimized for A2 ASHRAE-compliant environments using a high-efficiency liquid-cooled cold plate package design.
- **Open Standards Alignment:** Designed for OCP Modular Hardware System (MHS) integration. Supports OIF CMIS 5.3 management and IEEE DR optics.

Availability
The Guide DR Laser NIC will begin sampling in Q4 2026.

About Lightmatter

Lightmatter is leading the revolution in AI data center infrastructure, enabling the next giant leaps in human progress. The company's groundbreaking Passage® platform—the world's first 3D-stacked silicon photonics engine—and Guide®—the industry's first VLSP light engine—connect thousands to millions of XPUs. Designed to eliminate critical data bottlenecks, Lightmatter's technology delivers unprecedented bandwidth density and energy efficiency for the most advanced AI and high-performance computing workloads.

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