

Optical Engines Launches Polarium: The First All-Fiber, Highest Power Ultrafast Fiber Laser

With up to 375W average power in a fully sealed, vibration-hardened package, Polarium reduces setup from weeks to minutes and enables ultrafast performance in previously inaccessible environments.



Colorado Springs, Colorado Jun 13, 2025 ([Issuewire.com](https://www.issuewire.com)) - Manufacturers and integrators working with ultrafast lasers have long faced a trade-off: high precision requires large, delicate systems that are complex to align, maintain, and operate. Today, **Optical Engines Inc. (OEI)** announced **Polarium**, an all-fiber ultrafast laser platform that eliminates this compromise by removing every free-space component from the architecture.

Polarium combines OEI's proprietary CPTEC direct-pumped fiber amplifier technology with integrated seed lasers to deliver the performance of room-sized optical benches in a compact, sealed form factor. The result is ultrafast capability with no mirrors, crystals, or alignment steps, operational from power-on to full stability in under one second, and robust enough to meet environmental qualifications for vibration, shock, and extreme temperatures from -40°C to $+70^{\circ}\text{C}$.

Polarium delivers industry-leading performance with up to 400W average power - significantly exceeding competitors like Light Conversion's CARBIDE CB3 series (120W max), IPG Photonics' YLPF systems (200W max), and TRUMPF's TruMicro 5000 series (150W max). Combined with repetition rates exceeding 10 MHz, Polarium enables processing throughput and material thickness capabilities that outpace conventional ultrafast fiber laser architectures, positioning OEI as the clear leader in high-power ultrafast fiber laser technology.

The platform supports pulse energies from 500 nanojoules to 5 millijoules, pulse durations from 300 femtoseconds to 50 nanoseconds, peak power approaching 1 megawatt, and average power up to 375 watts. Beam quality is maintained at less than 1.2 M² across the product family. These specifications enable integration into production lines for micromachining, medical device fabrication, and high-throughput marking—without the delay, risk, or complexity typical of free-space systems.

“For our customers, uptime is everything. With Polarium, they can go from crate to calibrated process in 45 minutes,” said Scott Cannon, Director of Sales at OEI. “There’s no need to touch the system once setup. It’s not just plug-and-play, it’s production-grade.”

Polarium is designed to reduce the total time to capability, shifting integration from months of setup to under an hour. Customers can deploy modules without optical tables, alignment tools, or service visits. The sealed, monolithic design prevents contamination, the fixed internal architecture eliminates drift, and the vibration immunity proven in space applications makes it suitable for harsh environments.

“Customers are asking for ultrafast capability without the overhead,” said Don Sipes, CEO of OEI. “With Polarium, we removed the fragile optical chain, reduced the footprints by 50%, embedded the intelligence, and proved it in the field. We’ve shipped systems into industrial and aerospace environments with zero warranty returns over four years.”

The platform is available in multiple configurations tailored to application needs. Polarium Femto targets cold ablation and ultrafine features. Polarium Pico supports medical device manufacturing and semiconductor dicing. Polarium Nano is built for high-throughput material processing. Each variant shares the same sealed, maintenance-free architecture and can be scaled in production. OEI currently builds 50 units per month with capacity to grow.

OEI will be showcasing Polarium at **LASER World of Photonics 2025**, June 24–27 in Munich, Germany, at Booth B3.421 in collaboration with their partner Optoprim. Demonstrations are available by request, showcasing ultrafast material interaction and process repeatability across metals, polymers, and composites.

The Polarium platform is available now for demonstration and customer evaluation. To schedule a demo or request technical documentation, visit www.opticalenginesinc.com/polarium or contact OEI at sales@opticalengines.com.



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