Forward Photonics

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Forward Photonics is commercializing ground-breaking technology pioneered at MIT Lincoln Laboratory for ultra-bright direct-diode lasers.

Forward Photonics' Wavelength Beam Combining (WBC) Technology

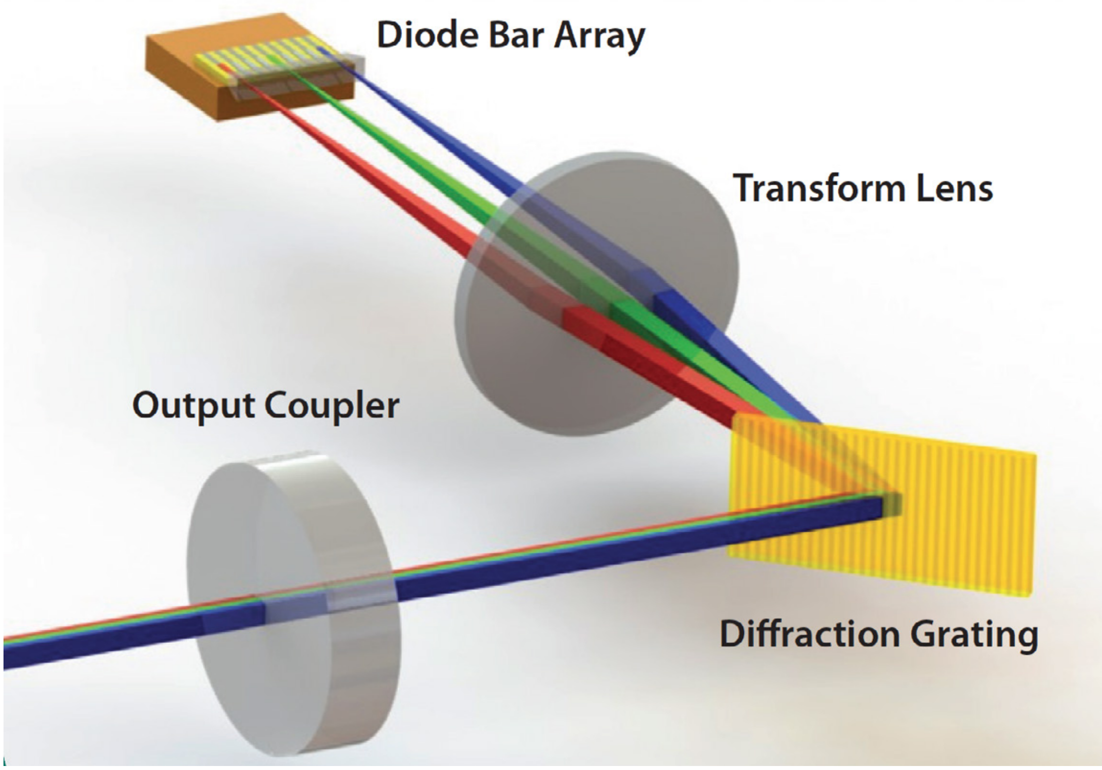
WBC can be thought of as the spatial and directional superposition of many independent diode laser external cavities. The angle-to-wavelength conversion property of a diffraction grating is used to provide feedback to each emitter in an array, via a series of lenses, at different wavelengths. The laser resonator is formed between the HR coated back facet of the emitter and the output coupler. WBC allows for brightness scaling of an emitter array because all of the laser elements are spatially overlapped at the output coupler, maintaining the output beam quality of a single element while scaling the output power by the number of elements in the array.

With this fundamental breakthrough in WBC technology, Forward Photonics is developing ultra-high brightness, direct-diode lasers that are bright enough for the most demanding defense and commercial applications. They combine unprecedented brightness with efficiency, reliability, wavelength diversity, and low cost. At Forward Photonics, we believe that direct-diode lasers will, in time, replace fiber, disk and other lasers for the most demanding applications.

Forward Photonics' WBC technology can be applied to any array of laser elements, over a wide range of power and wavelength combinations. Forward Photonics has demonstrated WBC using laser diode bars, QCLs, and stacks operating in the NIR and MWIR. Nevertheless, arrays of fiber, solid-state or gas lasers operating at wavelengths from the UV to longwave IR range can also be used.

Disruptive Simplicity

Invented at MIT and licensed to Forward Photonics



Forward Photonics' Quanum Blade Light Multi-QCL Laser.

Forward Photonics' High Powered Lasers

Leapfrogs in efficiency and cost of ownership

Products

Single Mode High Brightness 1 μm Lasers up to multi-kW Power Levels
High Brightness High Power MWIR Laser Systems at 4 - 10 μm
Custom Wavelength Multi-Watt WBC Lasers from 300 nm to 11 μm

Defense Applications

Forward Photonics' ultra-high brightness, direct-diode lasers enable many defense applications, including infrared countermeasures, target designators and directed energy weapons.

Forward Photonics' WBC technology offers ultra-high spatial brightness from a direct diode or semicondcutor laser. We believe this is the only approach to a 50 kW direct diode laser system that can meet the stringent SWaP, reliability, efficiency, and beam quality demands of defense applications. For Direct Energy Weapon (DEW) applications, Forward Photonics can produce a nearly diffraction-limited output that can be scaled to 50 kW and higher power levels. The WBC technology is based on more than ten years of government funded research at MIT Lincoln Laboratory which was led in part by our President Dr. Robin Huang.

Company Overview

Forward Photonics is a spinoff from TeraDiode; we employ the same groundbreaking beam combining technology patented from MIT Lincoln Laboratory, which allows us to achieve brightness scaling with virtually any semiconductor laser material. We have experience designing and manufacturing lasers at a wide range of wavelengths, from UV to LWIR, and up to multi-killowatt power levels.

Our technology enables a variety of defense, industrial, and scientific applications, including power delivery, materials sensing, and target illumination. Direct diode lasers offer comparable power and beam quality to fiber lasers, but are able to provide superior reliability and wavelength flexibility, and meet the demanding SWaP requirements of industrial and military environments

Key Management

- President: Dr. Robin K. Huang
- VP of Engineering: Mike Cruz
- Program Manager: Dr. Jeff Shattuck
- Optical Engineer: Dan Dugmore

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