



Ultra-high Power Diamond Lasers and Beam Combiners

BACKGROUND

Maintaining beam quality lasers having power much greater than 10 kW is a major challenge in the multi-billion-dollar market sector of directed energy.

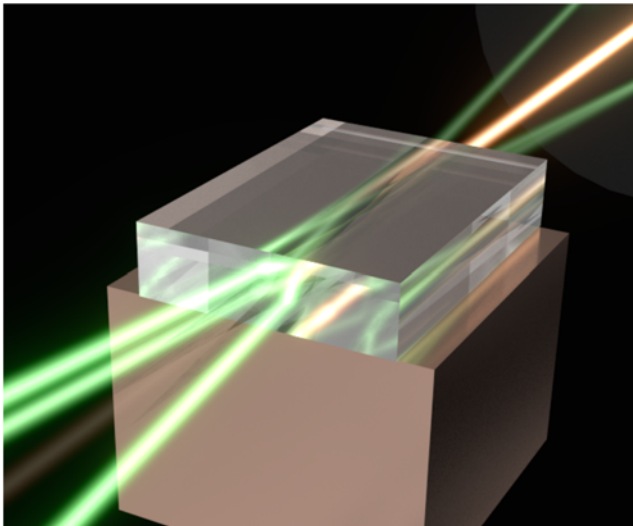
Currently, 10-15 kW fibre lasers are available, however, higher powers with TEM₀₀ output are yet to be demonstrated and more than 100kW is required.

OUR SOLUTION

This invention uses diamond to combine power from multiple beams or modes into a pure high-quality output laser mode.

We disclose here methods and embodiments that will increase power handling capability by a factor of more than one hundred without saturation.

The major novel and inventive steps involve advanced design and materials involving diamond to enable generation of high quality beams at powers above 100 kW.



APPLICATIONS

- ✓ Directed energy for use in defence
- ✓ Space propulsion and debris manipulation
- ✓ Long range remote sensing
- ✓ Energy beaming

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FEATURE	BENEFITS
Exploits the most thermally conductive optical material	The premier gain medium for high brightness generation
Based on stimulated Raman scattering	Amenable for high power generation from laser oscillators, amplifier and beam combiners
Wavelength shifting across visible and infrared	Enables generation of wavelengths in important regions such as the eye-safe region and atmospheric windows

INVENTORS

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INTELLECTUAL PROPERTY POSITION

Australian Patent Application:

High power Raman laser system and method

PUBLICATIONS

A. McKay, D. J. Spence, D. W. Coutts, and R. P. Mildren, "[Non-Collinear Beam Combining of Kilowatt Beams in a Diamond Raman Amplifier](#)," in *Advanced Solid State Lasers*, OSA Technical Digest (online) (Optical Society of America, 2014), paper ATu5A.1.

WOULD YOU LIKE TO KNOW MORE?

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