

FLASH

Flexible Laser-Based Manufacturing



NEWSLETTER #2

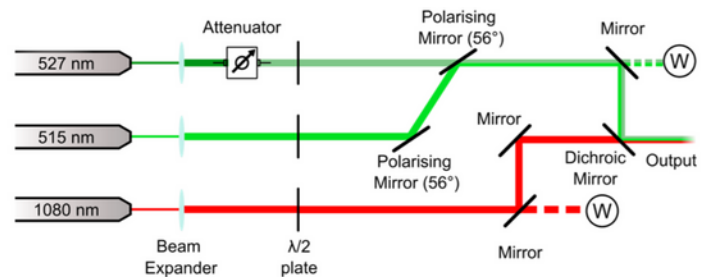


December 2024

Preparation of three laser beam coupling module

The FLASH system is revolutionizing precision laser machining with its innovative use of three distinct laser sources. These sources—a 1080 nm continuous wave (CW) infrared laser, a 515 nm “short” pulse (1–10 ns) laser, and a 527 nm “long” pulse (300 ns) laser—enable simultaneous multi-wavelength emission with a diverse range of pulse durations. This unique configuration provides unmatched flexibility in laser-based material processing.

The combination of these three laser sources with three beam delivery heads offers exceptional flexibility for various machining applications.

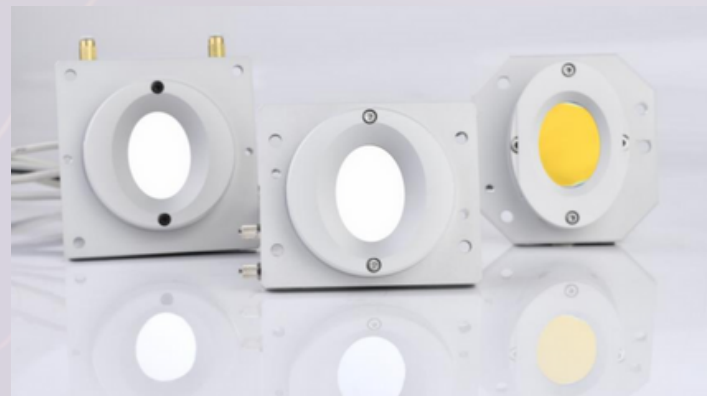


The system is capable of performing tasks such as welding, cutting, drilling, texturing, micro-machining, and macro-polishing. Each laser source’s unique wavelength and pulse characteristics enable it to address specific machining needs with varying degrees of precision and efficiency, depending on the material and the desired outcome.

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DYNAMIC BEAM SHAPING

In the fast-evolving field of high-power laser applications, precision and adaptability are paramount. This is taken into account by the integrative concept of the FLASH machine. ROBUST AO introduced a breakthrough in Dynamic Beam Shaping (DBS) with Zwobbel® technology, designed to revolutionize laser cutting and processing.



By enabling rapid, dynamic adjustments to the laser beam’s energy distribution, Zwobbel® provides unmatched control over the laser’s interaction with the material, making it ideal for high-quality manufacturing tasks.

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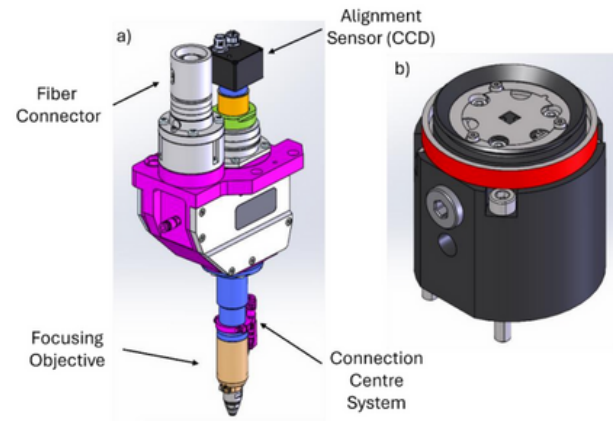
Adaptation of optical head for waterjet guided laser

The FLASH project brings together three different interchangeable optical heads: nozzle, waterjet guided, and galvo scanner based. These three optical heads are to be substituted automatically using robotic arms in a short time frame of 10-15 seconds, which currently takes several hours.

This provides a rapidly customisable solution to suit a variety of materials and applications. This rapid changeover of heads poses various challenges including retaining the high precision of the optical-laser system.

The integration of the Synova waterjet guided laser optical head provides its own unique challenge of protecting other optical heads and processes from the inherent water present in the waterjet guided laser process.

This aims to be resolved using a jet catcher and drainage system, which are currently in development.



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