# **Deposited Energy Flat Top (DEFT)**

#### **Overview:**

A laser with a high quality single mode Gaussian output beam is often required in laser additive manufacturing (powder-bed based) as it creates the smallest spot possible, allowing very fine features to be made. However, the Gaussian profile is not the ideal profile for the process of laser sintering the fine powder of the additive manufacturing (AM) machine.

The optimum AM process is likely to require a near uniform heat input to the powder-bed. This requires a complex intensity profile – but one which the Deposited Energy Flat Top: DEFT – is able to produce.

The DEFT beam shaper has the potential to increase the AM throughput and optimise energy efficiency: the laser profile is a closer match to the fundamentals of the AM process.

### The PowerPhotonic Effect:

>**95%** shaping efficiency

Increased throughput in additive manufacturing

Uniform energy when translated

#### **Intensity Profile**



Gaussian deposited energy when translated





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## Measured Example Output



**Intensity Profile:** A Gaussian beam produces a Gaussianshaped energy deposition, the DEFT ring-like output produces a flat top energy deposition.

**Measured Example Output:** An example DEFT beam shaper output measured in a lab-based functional setup.

#### **Key Features:**

- Increased throughput
- Optimised energy efficiency





Additive
Manufacturing



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### **Specifications**

Parameter	Selectable Value
Design Wavelength	300 - 2000 nm
Input Beam Diameter	> 2mm
Output spot size	System specific - typically 5 x larger than unshaped spot
Substrate geometry	Customisable

## Typical System Set Up



## **Customisable Spot Size:**



The output size is customisable, always producing a flat energy distribution when translated.

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