



## LASER-BASED MANUFACTURING PROCESSES AND APPARATUSES

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### The Invention

UW-Madison researchers have developed an optical sensor for monitoring of laser-based manufacturing processes such as 3D printing. The device uses wavelength-swept lasers tuned across the absorption features of the elements in the metal vapor plume. The interrogation laser is coupled coaxially to the process laser and the backscattered light is collected through the same optical path after passing through the vapor plume. This configuration allows the sensor to be easily mounted to commercial 3D printers or laser welding machines and glean information on the temperature, pressure, composition and microstructure of the part. The data acquisition can be in the high kilohertz range. With machine-learning based live processing, this sensor facilitates quality control of laser-based manufacturing and reduces the need for destructive or expensive non-destructive testing of the final product. It would further allow machine operators to more quickly determine optimal settings for new alloys.

### Additional Information

#### For More Information About the Inventors

- [Scott Sanders](#)
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#### Tech Fields

- [Engineering : Additive manufacturing](#)

For current licensing status, please contact Michael Carey at [mcarey@warf.org](mailto:mcarey@warf.org) or 608-960-9867