PURDUE INNOVATES | Office of Technology Commercialization

# Neutron Pulse Pumped Laser Material

**Compact neutron-pulse laser material measures reactor neutron flux and power with 100 ns response and small footprint, ideal for microreactors.**

Researchers at Purdue University have developed a compact, cost-effective and innovative sensor material that can be used for measuring neutron flux in nuclear reactors. This technology enables the measurement of nuclear reactor power output over time under steady state or transient conditions. While this technology can be used across a wide range of reactor sizes, it is particularly advantageous in microreactors where the neutron flux sensor instrumentation needs to be small yet robust to accommodate the reactor core size. The system can measure neutron power, neutron flux, total fluence, and thermal/fast neutron spectrum. This technology has applications in nuclear reactors on a commercial or research scale, as well as in non-reactor neutron environments.

**Advantages**:

- Response times as fast as 100 ns

- Neutron flux detection

- Small overall size

**Applications**:

- Commercial, micro, or modular nuclear reactors

- Sensors in non-reactor neutron environments

**Technology Validation:**

This technology has been validated through the fabrication of the sensor material. Transmittance and luminescent spectra testing is ongoing.

**TRL:** 4

**Intellectual Property:**

**Technology ID**

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**Category**

Aerospace & Defense/Defense Electronics & Surveillance Technologies

Energy & Power Systems/Power Generation

Robotics & Automation/Perception & Sensing

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