

Laser research could benefit nuclear recycling

August 27, 2013 by Alexandra Branscombe, [Idaho National Laboratory](#)



Laser-Induced Breakdown Spectroscopy uses a high-power laser within the Center for Advanced Energy Studies at INL. The technique can discern the contents of used nuclear fuel and potentially boost the global security of nuclear recycling. Credit: Post Register

James Bond uses a laser beam to cut through windows and walls, but scientists at the Center for Advanced Energy Studies (CAES) are using a new laser that can melt metal.

The [laser](#) resides in the CAES Radiochemistry Lab. Within a special room inside an impeccably clean and ultra-secure laboratory, scientists are evaluating a system called Laser-Induced Breakdown Spectroscopy (LIBS), which uses a high-power laser to discern the contents of used nuclear fuel.

Some countries have chosen reprocessing as a way to reduce high-level waste and get more energy from used [nuclear fuel rods](#). However, fuel reprocessing must include safeguards that account for the quantities of nuclear material, as well as maintain process control and safety. The ability to identify elements such as plutonium and uranium that are present in the used nuclear fuel is an important part of this process.

For example, from a security standpoint, a system that can detect the absence of a particular element or isotope can help deter nuclear material theft. This type of rapid-detection system could benefit public safety and global security.

Today, the process to analyze isotopes is time-intensive—typically taking days to transport, process and analyze a sample. For international safeguards, this process takes even longer, since the samples must be sent to a different facility, often in another country. At the CAES Radiochemistry Laboratory, researchers are working to prove a method that would reduce that time to a matter of minutes.

"This is vital in improving material accountability in nuclear reprocessing," said Supathorn Phongikaroon, a University of Idaho/CAES researcher and the project's principal investigator. CAES is a partnership between Idaho National Laboratory, Boise State University, Idaho State University and University of Idaho. "We have to find the optimal way of controlling and managing waste in the U.S., and LIBS is one possible option that we are exploring."

Read more at: <https://phys.org/news/2013-08-laser-benefit-nuclear-recycling.html#jCp>