

# Detecting toxic hazards in a split second

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A portable laser device is being developed at Heriot-Watt that can instantly identify chemical hazards, increasing the safety of emergency services and military personnel.

In an emergency scenario or [military operation](#) there can be uncertainty over whether liquids or gases are toxic, causing delays. The new [laser technology](#) could rapidly identify substances, meaning those in charge can decide whether the situation is safe or whether they need to start decontamination procedures.

Professor Derryck Reid, leader of the Ultrafast Optics Group at Heriot-Watt, is using lasers that pulse light lasting less than one millionth of one millionth of a second to read chemicals' 'colour fingerprints' and detect whether they are toxic or not.

Professor Reid said, "This system could rapidly sweep a person, vehicle, room or open space for the fingerprints of chemical or biological hazards. In a military scenario it could provide a commander with the information needed to continue an operation safely, but there are a number of potential civilian uses. The [emergency services](#) and airport security personnel could also find it extremely useful.

"Chemicals absorb light at different parts of the infrared spectrum depending on the bonds they have formed. When the light from our laser touches a chemical the colours of the light that bounce back show which chemicals it has interacted with.

"The colour patterns that are scattered back for any chemical are unique, like a fingerprint. The laser reads this fingerprint and the [chemical](#) is rapidly identified, whether it's benign or toxic."

The entire apparatus could be engineered into a relatively compact, easily portable unit. Professor Reid is also investigating a higher power version that could be mounted on a platform, for example

being placed on the front of a car to scan upcoming terrain.

Provided by Heriot-Watt University

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