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Science **NOW** UP TO THE MINUTE NEWS FROM SCIENCE

ScienceShot: Sniffing Out the One in a Quadrillion

by Jon Cartwright on 9 December 2011, 11:41 AM | [0 Comments](#)

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Detecting tiny amounts of gases might seem dull, but when it comes to spotting traces of toxic substances that are intended for chemical attacks, it can make the difference between life and death. Now, scientists have improved the sensitivity of gas detection almost 1000 times over, paving the way for more-rigorous security operations and even a novel way of performing carbon dating. The method requires a gas mixture—perhaps sampled from a suspect area—to be injected via a tube into a cavity with parallel mirrors on each side. When laser light is shone into the gas mixture, it bounces back and forth between the mirrors so many times that it clocks up about 10 kilometers. Over this distance some of the light is absorbed, and the wavelength at which it is absorbed reveals what types of molecules are present. Tested on a carbon dioxide mixture, the method detected a minuscule component—just 43 parts in every quadrillion—that contained radioactive carbon atoms rather than normal carbon atoms, the team will report later this month in *Physical Review Letters*. Aside from [more sensitive detection of chemical-warfare agents](#), the technique offers a cheaper and simpler way to age artifacts via carbon dating, which usually requires huge particle accelerators to extract radiocarbon atoms from a sample.

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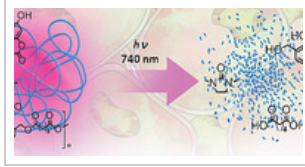
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