

SCIENCE NEWS Online

THE WEEKLY NEWSMAGAZINE OF SCIENCE

■ [Print Article](#)
■ [E-mail Article](#)

Week of Oct. 1, 2005; Vol. 168, No. 14, p. 222

Light sensor may improve battlefield tools

Peter Weiss

Frontline troops depend on extraordinarily sensitive optical detectors in systems that test the air for anthrax or other harmful agents. Other prototype systems use such detectors in devices that transmit secure communications. Yet the detectors, known as photomultiplier tubes, tend to be large, fragile, and power-hungry.

Now, engineers have created a microscale ultraviolet light detector that's sturdier and consumes far less power, compared with ultraviolet-sensitive tubes. Field instruments using this detector and others tuned to other wavelengths could shrink field instruments from the size of a soldier's helmet to the dimensions of a cell phone.

Manijeh Razeghi of Northwestern University in Evanston, Ill., and her colleagues created the ultraviolet light sensor, known as an avalanche photodiode. The university announced the advance on Sept. 13. Whereas photomultiplier tubes have delicate glass housings, the new detector is made of rugged materials. However, what's most distinctive about the new photodiode is its short operating wavelength of 280 nanometers. That makes it the first component of its kind to operate in a region of the electromagnetic spectrum called solar-blind, Razeghi says. Solar-blind devices can communicate with each other by means of extremely weak signals that are difficult for anyone else to monitor, she notes.

The new photodiode is also the first of its ilk that can identify the amino acid phenylalanine in airborne microorganisms. Consequently, the new detector augments miniature systems that distinguish pathogens, Razeghi says.

The new work "demonstrates that it's possible to take photomultiplier technology out [of such systems] and to replace it with something that's much smaller and much more robust," comments Henryk Temkin of the Defense Advanced Research Projects Agency in Arlington, Va.

If you have a comment on this article that you would like considered for publication in *Science News*, send it to editors@sciencenews.org. Please include your name and location.
