T-ray vision sees through clothes

Heather Catchpole (http://www.abc.net.au/profiles/content/s2110135.htm?site=science)
ABC

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A machine that sees through clothes to detect guns and drugs could improve airport security, scientists say.

It would use a type of electromagnetic radiation known as terahertz rays or t-rays, low-energy emissions whose frequencies lie between infrared and microwaves.

T-rays are non-ionising radiation and are safer to humans than x-rays, said Australian researcher Professor Derek Abbott from the University of Adelaide (http://www.adelaide.edu.au/) , which this week hosts an international conference on how t-rays can be used for defence and security.

Abbott said t-rays were originally discovered by astronomers who used them to look at stars and galaxies. But the rays weren't generated in a laboratory until 1995.

He said t-rays could penetrate packaging, giving an exact molecular "fingerprint" of substances inside.

"T-rays go straight through plastics and moulded suitcases," Abbott said. "You would be able to tell if it is benign talcum powder or anthrax."

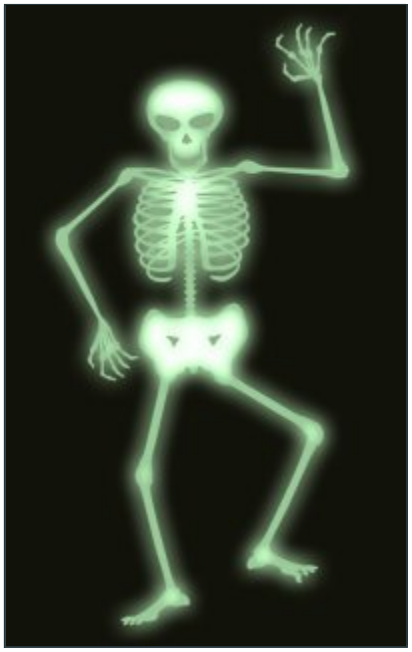
A machine that used t-rays could also scan humans by seeing through their clothes, Abbott said.

He said a U.K. private defence firm had already developed a prototype machine that could do this to scan for guns and other weapons.

But he admitted there was some public concern about this.

"People don't want to walk through an airport and think is someone going to ogle at my naked body."

But Abbott said the ethical issue could be avoided by using an automatic system that only alerted a security guard if a weapon was found.



T-ray electromagnetic radiation could see right through you, just like x-rays, but are thought to be safer *(Image: iStockphoto)*

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He also said that software could make bodies appear fuzzy but make a gun stand out.

"You'd be able to see the weapons and where they are on the person," he said.

Good vibrations

Fire a bunch of t-rays at a molecule and it will absorb those frequencies identical to the frequencies at which it vibrates, Abbot said.

The result is a "fingerprint" vibration pattern, unique to that substance.

Abbot said t-rays could even be used to detect cancer, or check for genetic diseases such as Alzheimer's.

U.S. researcher Professor Xi-Cheng Zhang of the Rensselaer Polytechnic Institute (http://www.rpi.edu/) in New York is known as the "father of t-rays" because he led the team that first generated t-rays in free space.

Zhang is at the conference to talk about how t-rays can test for defects in the thermo-insulation of space shuttles.

"Last year we lost the space shuttle Columbia because of defects," Zhang told *ABC Science Online*.

"T-rays are the best method to identify the defects."

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