



Inside TSA scanners: How terahertz waves tear apart human DNA

by Terrence Aym

While the application of scientific knowledge creates technology, sometimes the technology is later redefined by science. Such is the case with terahertz (THz) radiation, the energy waves that drive the technology of the TSA: back scatter airport scanners.

Emerging THz technological applications

THz waves are found between microwaves and infrared on the electromagnetic spectrum. This type of radiation was chosen for security devices because it can penetrate matter such as clothing, wood, paper and other porous material that's non-conducting.

This type of radiation seems less threatening because it doesn't penetrate deeply into the body and is believed to be harmless to both people and animals.

THz waves may have applications beyond security devices. Research has been done to determine the feasibility of using the radiation to detect tumors underneath the skin and for analyzing the chemical properties of various materials and compounds. The potential marketplace for THz driven technological applications may generate many billions of dollars in revenue.

Because of the potential profits, intense research on THz waves and applications has mushroomed over the last decade.

Health risks

The past several years the possible health risks from cumulative exposure to THz waves was mostly dismissed. Experts pointed to THz photons and explained that they are not strong enough to ionize atoms or molecules; nor are they able to break the chains of chemical bonds. They assert—and it is true—that while higher energy photons like ultraviolet rays and X-rays are harmful, the lower energy ones like terahertz waves are basically harmless. [Softpedia.com]

While that is true, there are other biophysics at work. Some studies have shown that THz can cause great genetic harm, while other similar studies have shown no such evidence of deleterious affects.

Boian Alexandrov at the Center for Nonlinear Studies at Los Alamos National Laboratory in New Mexico recently published an abstract with colleagues, "DNA Breathing Dynamics in the Presence of a Terahertz Field" that reveals very disturbing—even shocking—evidence that the THz waves generated by TSA scanners is significantly damaging the DNA of the people being directed through the machines, and the TSA workers that are in close proximity to the scanners throughout their workday.

From the abstracts own synopsis:

"We consider the influence of a terahertz field on the breathing dynamics of double-stranded DNA. We model the spontaneous formation of spatially localized openings of a damped and driven DNA chain, and find that linear instabilities lead to dynamic dimerization, while true local strand separations require a

threshold amplitude mechanism. Based on our results we argue that a specific terahertz radiation exposure may significantly affect the natural dynamics of DNA, and thereby influence intricate molecular processes involved in gene expression and DNA replication."

In layman's terms what Alexandrov and his team discovered is that the resonant effects of the THz waves bombarding humans unzips the double-stranded DNA molecule. This ripping apart of the twisted chain of DNA creates bubbles between the genes that can interfere with the processes of life itself: normal DNA replication and critical gene expression.

Other studies have not discovered this deadly effect on the DNA because the research only investigated ordinary resonant effects.

Nonlinear resonance, however, is capable of such damage and this sheds light on the genotoxic effects inherent in the utilization of THz waves upon living tissue. The team emphasizes in their abstract that the effects are probabilistic rather than deterministic.

Unfortunately, DNA damage is not limited only to THz wave exposure. Other research has been done that reveals lower frequency microwaves used by cell phones and Wi-Fi cause some harm to DNA over time as well. ["Single- and double-strand DNA breaks in rat brain cells after acute exposure to radiofrequency electromagnetic radiation."]

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