In the following three e-mails Ronald N. Kostoff, PhD addresses
Radio Frequency Radiation (RFR) and the Disappearance of Insects.

Wednesday, October 17, 2018 12:55 PM

"The Insect Inspector Report" — https://www.youtube.com/watch?v=aHhUch5GgtY — is an excellent video. As the following reference shows, EMF couples greatest to insects (or any effective antenna) when the wavelength of the RFR (Radio Frequency Radiation) is on the order of the insect dimension. This will be especially important with 5G, where wavelengths will be in the millimeter range. https://www.nature.com/articles/s41598-018-22271-3

All living things, including insects and humans, are multi-scale structures. There is the molecular level, the cellular level, the tissue level, the organ level, and the macro-structure level. One would expect the absorption of RFR (and lower frequency EMF as well) to be different with each of these structures for different frequencies and their associated wavelengths.

So, one RFR frequency may have better absorption in an insect's antennae, while another may have better absorption in its wings. Given the wide range of all the RFR to which we are being, and are projected to be, exposed, I would expect any bodily structure of interest, whether insect, animal, or human, to be affected.

With 5G, we may have developed the ideal insecticide. Unfortunately, like most/all chemical insecticides, it will end up destroying the sprayer as well as the sprayed.

As I've stated before, 2G-4G, and most especially 5G, will produce the modern version of Jonestown 1979, times 1,000,000. We are mixing the Kool-Aid and drinking it without the need for machine guns pointed at our head!

RNK

Wednesday, October 17, 2018 3:37 PM

The email I sent a few hours ago was the good news. Here is the bad news.

I'll relate the insect RFR problem to a computation I did forty years ago for a completely different application. At the time, I was working on different aspects of Controlled Fusion. Now, for the deuterium-tritium fuel cycle (which was the dominant fusion fuel cycle at that time, and still may be), the energy from the fusion reaction is carried by fast neutrons, alpha-particles, and thermal radiation. Most of the energy is in the fast neutrons.

The fast neutrons can then be used to breed fissile fuel, or for heating/power production. If the latter, then the fast neutrons are absorbed in a thick metallic structure surrounding the fusion core, converted to thermal energy, and serve as the boiler in a thermodynamic heat cycle. The heat cycle converts the thermal energy into electricity.

The question in my mind related to how much this thick metal plate surrounding the fusion core would heat up as a function of the pulsing frequency of the fusion power emitted from the fusion core. The different types of fusion reactors being developed forty years ago ranged from essentially steady-state power output (tokamak, stellarator) to very short-pulsed power output (inertial fusion).

In my calculations, I kept the average neutron power absorbed constant (obviously, we want the power plant to have steady power production at some target level), and varied the pulsing frequency (essentially the rate at which energy would be deposited in the thick plate.

When the time period for energy deposition in the plate was large with respect to the thermal time constant of the plate, the temperature in the plate rose slightly. This is because the energy being absorbed in the plate had time to diffuse to the surface and be radiated/convected/conducted from the surface. However, when the time period for energy deposition in the plate was short with respect to the thermal time constant of the plate, the temperature in the plate went through the roof. This is because the energy being absorbed in the plate did not have time to diffuse to the surface. It was converted to internal energy, and was expressed by raising the temperature of the plate substantially.

I'll give a simpler example to illustrate this effect. Suppose one takes a shower using 25 gallons of water over 15 minutes, with constant flow. The drain holes in the floor are sized such that after a very short time, the water coming down equilibrates with the water being drained, and the water buildup on the floor is a very thin layer.

Now, suppose that 25 gallons was not delivered over 15 minutes, but rather was delivered over one second. Scuba gear would be most appropriate. The water would not have had the time to drain from the enclosure, and could only contribute to raising the height of the water in the enclosure.

Now, back to the insect-RFR interaction problem. As far as I know, RFR heating estimates for tissue absorption are computed as average power fluxes over a relatively long period compared to the time constant of the tissue. But, for RFR, the energy is not delivered in a steady-state. Like the inertial fusion concepts, the energy is delivered in a very short fraction of the full cycle. Therefore, the peak power to average power during a cycle can be quite large. I have seen estimates of this ratio ranging from 100 to 1000. For all I know, there may be cases where the ratio is even larger than 1000.

So, depending on the insect's overall dimensions, and effective thermal time constant, the heating could be large in spots. From the perspective of the RFR, the insect is an assemblage of antennas, different in size, but connected. While the overall insect could experience minimal temperature rise on average, there could be structures (e.g., antennae, legs, wings, etc.) that experience large temperature rises because they can't dissipate the short energy pulses fast enough. If these smaller structures are critical to navigation, then they could be functionally destroyed by even modest temperature increases, and render the insect defenseless and non-functional.

It's like a human. If a small amount of acid gets squirted in one's eyes while they are in the jungle, they are finished. The rest of the body could be fine, but the disabling of a critical system left them non-functional.

The point is, as the RFR frequencies decrease to the order of insect sub-structures, they may in fact be able to disable the insects from a thermal perspective if the energy absorption and heating is heterogeneous.

I'm not clear what effect the increased power fluxes due to pulsing would have on the athermal effects; I imagine they would not be positive. And, lest we forget, we now have a combination effect: the thermal effect on sensitive structures coupled with athermal effects. Typically, such combination effects result in synergies of the individual harmful effects.

I guess the modern day equivalent of the canary in the coal mine is the insect in the RFR field.

RNK

Thursday, October 18, 2018

Disappearing Insects

I sent out the two emails above to a limited distribution showing one possible explanation of the large reduction of insect population around cell towers. I wanted to summarize and amplify the contents of those emails to a larger distribution, and that's the purpose of this email.

We should also note that the thermal shocks described below will be repetitive. Thermal shocks, and the attendant thermal stresses, can lead to thermal fatigue. Presence of thermal fatigue in engineering systems can be very damaging, and is a key factor in the failure of many physical structures. I assume it would be problematical in biological structures as well. Chronic exposures to RFR will be a key factor in any thermal fatigue effects.

The video "The Insect Inspector Report" addresses the vanishing insect population. The narrator ascribes this disappearance, in part, to the effects of RFR on the insects, and showed evidence that insect populations around cell towers are especially reduced.

There are three issues of concern here: coupling, pulsed heating, and free space exposure.

Coupling

The coupling/impedance matching between the RFR and the target is best when the RFR wavelength is on the order of the antenna/target dimensions. Typical cell phone (4G) frequencies are in the 1-2 GHz range. One GHz wavelength is 30 cm (11.8 in.), and two GHz is 15 cm (5.9 in.). Thus, best coupling will be with structures/antennae on the order of one foot or 1/2 foot. Most common insects are much smaller, and coupling will not be optimal.

If the video narrator is correct in his assertions, then even under conditions of non-optimal coupling/energy transfer, there is sufficient energy transferred to disable/destroy the insects. In other words, even moderate amounts of RFR may be adequate to be extremely destructive, at least to insects.

As a side note, these 4G frequencies have wavelengths much closer to small children dimensions, as well as to adult heads, limbs, etc. I would expect good coupling with these structures/effective antennae.

For 5G, which covers the wavelength range from a few centimeters to a few millimeters, the coupling to various creatures will change. Coupling to insects should improve greatly, along with levels of energy transfer. I would expect the effects on insects to be far worse.

I would also expect the effects on smaller structures/smaller effective antennae on all animals to be larger. I'm not all that familiar with insect structures, but if insects have well-defined sub-structures for sensing/navigation purposes, and these are damaged by strong coupling to RFR, that's all that is required to destroy the insect. It's not necessary to "cook" the insect.

So, it's really the RFR coupling to the critical sub-structures that is of highest importance for survival, and the RFR coupling to the larger sub-structures (used mainly for structural support and integrity) may be less important (although not unimportant). The same would apply to humans, and the coupling of the RFR to critical sub-structures would be very important.

Pulsed Heating

This topic is based on the structure of the RFR signal.

RFR tends to have a signal consisting of a very short pulse of high intensity energy followed by a downtime many times larger than the energy pulse width. Under such conditions, the ratio of peak power to average power can be large. I have seen estimates for this ratio ranging from 100 to 1,000; I wouldn't rule out the possibility of even larger ratios.

Why and when is this significant? As I showed yesterday for a completely different application, when energy is deposited in a material whose thermal time constant is long with respect to the energy pulse time, all the deposited energy effectively goes into raising the temperature of the material. The energy does not have the time to be conducted through the material and emitted from the surface because of the material properties.

Consider two solid spheres impacted by RFR. One sphere is metal, the other is water. Assume a pulse of RFR energy is deposited uniformly within each sphere. The metal is a good conductor, and, depending on the size of the sphere, much of the energy can be conducted to the surface and emitted in a relatively short time period, thereby limiting the temperature increase in the material. Water is a relatively poor conductor, so the energy won't have time to exit the water sphere. The water sphere will experience not only a relatively large temperature increase, but a large temperature shock, since this increase will occur over a short time period. The water sphere model would be much more representative of biological systems (with their high water content) than the metal sphere model.

Thus, with good coupling of the RFR to the appropriate target/antenna, and under conditions where 1) the pulse of the RFR is total cycle energy over a very short time period and 2) the thermal time constant of the target material is long relative to the width of the pulse when the energy is being deposited, potentially damaging thermal effects can occur. For signals with this type of pulsing structure, peak to average power becomes critical. Deposition of this energy into e.g. insect antennae could result in thermal shocks sufficient to effectively disable the insect.

While the anti-RFR infrastructure community has been emphasizing athermal effects over thermal effects for the RFR signals, it may very well be that the thermal effects should not be ignored under the above-postulated conditions. For the extreme pulsing case, we may in fact have the COMBINATION of adverse thermal effects occurring concurrently with adverse non-thermal effects to produce a very damaging synergy.

Free Space Exposure

While 5G appears to be targeted mainly to mobile applications, I have seen a number of papers addressing the issue of how to penetrate buildings more effectively with 5G. If wireless is desired for this application rather than wired, then it seems to me the main option for increasing penetration (for a given frequency) is to ramp up the power as much as allowed. While, to first approximation, the same fraction of RFR will be absorbed by the windows in the high power and low power cases, starting with a high power outside will produce a relatively high power inside.

The consequence of this is that people and animals in open space near the 5G transmitters will be subject to much higher RFR intensities than required for open space communications. This higher power should intensify the insect exposures and destruction (along with the increased coupling of the insects to 5G), and create an extremely toxic environment for pedestrians, motorcyclists, bicyclists, etc.

BOTTOM LINE — We may want to revisit the issue of RFR thermal effects, since short-pulse energy deposition in animal tissue could have severe consequences.

Comments, corrections, etc, are welcome.

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Biography

Ronald N. Kostoff received a PhD in Aerospace and Mechanical Sciences from Princeton University in 1967, and subsequently worked for:

- Bell Laboratories,
- Department of Energy,
- Office of Naval Research, and
- MITRE Corp.

Presently, Research Affiliate at Georgia Institute of Technology.

Published over 200 peer-reviewed articles, served as Guest Editor of four journal Special Issues since 1994, and obtained two text mining system patents. Published on numerous medical topics in the peer-reviewed literature, including:

- potential treatments for Multiple Sclerosis, Parkinson's Disease, Raynaud's Phenomenon, Cataracts, SARS, Vitreous Restoration, and Chronic Kidney Disease;
- potential causes of Chronic Kidney Disease and Alzheimer's Disease;
- potential treatment protocol for prevention and reversal of Alzheimer's Disease;
- impacts of toxin combinations on determining Exposure Limits;
- inadequacies of present Occupational Exposure Limits;
- potential impacts of Electromagnetic Fields on health.

Listed in:

- Who's Who in America, 60th Edition (2006);
- Who's Who in Science and Engineering, 9th Edition (2006); and
- 2000 Outstanding Intellectuals of the 21st Century, 4th Edition, (2006).