Kostoff

From: Kostoff, Ronald N
Sent: Wednesday, October 17, 2018 3:37 PM
To: André Fauteux
Cc:
Subject: Re: The Insect Inspector Report ... a must see video!!!!!!

Andre,

The email I sent a few hours ago (below) 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 1 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

From: Kostoff, Ronald N
Sent: Wednesday, October 17, 2018 12:55 PM
To: André Fauteux
Cc:
Subject: Re: The Insect Inspector Report ... a must see video!!!!!!

Excellent video. As the following reference shows, EMF couples greatest to insects (or any effective antenna) when the wavelength of the RFR 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