**Title: How to open the lid in complex systems - from telecommunication to electrophysiology**

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**Abstract:** As prominent members of energy preserving (i.e. lazy) mankind, we tend to use/abuse intellectual cliches to project any new knowledge onto our semantic space. This reduces cognitive dissonance and brings us back to safety. I would like to refer to two distinct examples in the area of complex systems.

In bioengineering, we tend to use equivalent circuits, which are treated as representation of many biological, chemical and physical processes. They ease interpretation of any process up to the level of absurd. If any voltage drop can be represented as a resistor, what does it actually explain from the rich physical reality? Here I show our recent results on propagation of ECG as an electromagnetic wave. They show what can you achieve if you move only one step deeper in theory, to consider a complex nature of human tissue, instead of a typical assumption, that a man is made of metal. It is also important to remember words of caution expressed by Kenneth Cole and Alexander Mauro, on how not to abuse permittivity spectra. We get to conclusion, that complex system physics as an important tool to understand the reality, and that interpretation of large data using domain knowledge always has advantage over plain AI methods.

In telecommunication, in turn, we (complex systems physicists) have a tendency to treat internet as a huge, flat, evolutionary network. I argue, that if you ask network engineers, they rather see a network of networks, which are present in many different layers. Some of them, indeed, represent evolutionary networks, where physics of complex systems should be applied in order to find answer of well-posed and important business problems. In telecommunication we definitely know the answer, but we are still looking for good questions and good areas of application, that would be acknowledged by network traffic engineers. It is not about answering our own questions. It is about the huge amounts of data, which should be opened in a meaningful way. I also refer to presence of specific traffic patterns, which are important both for traffic engineering and for cybersecurity.

**Keywords**: Electrocardiography (1); Impedance spectra (2); Telecommunication network (3).

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