

# Consciousness as coherent excitation of a hybrid quantum field

Suzy Lidström and Roland E. Allen

*Texas A&M University, Mail Stop 4242, College Station, USA*

This talk will contain both the original proposal of the title and a broad overview of related basic descriptions of consciousness, with emphasis on the links to fundamental physics, as a complement to the large number of more detailed experimental and theoretical studies. In the spirit of previous ideas in the neuroscience community, but with a more physics-oriented perspective, we begin with the interpretation that consciousness is the collective excitation of a “brainwide web” of neural cells. This picture is inspired by the fact that, in all major areas of physics, a collective excitation has just as much physical reality as a particle or other localized object. The brainwide web extends into those regions (neuronal and glial networks) where processed information is received from the senses, memories, etc. (emerging out of unconscious processes in prior networks). It unifies those regions (plus motor control regions) via the vast complexity of the neural interactions that it spans.

At the most fundamental level, all physical phenomena result from excitation of quantum fields (since, in current physics, these fields are the bedrock of reality). It follows that, in the present picture, quantum physics solves the old combination (or binding) problem of consciousness, since the experience of consciousness requires coherent excitation of only a single hybrid electron-electromagnetic field.

This talk extends the work of our previous publications [1,2,3].

- [1] Suzy Lidström and Roland E. Allen, “Consciousness as the collective excitation of a brainwide web—understanding consciousness from below quantum fields to above neuronal networks”, *J. Phys: Conf. Ser.* 1275, 012021 (2019), <https://doi.org/10.1088/1742-6596/1275/1/012021>.
- [2] Suzy Lidström and Roland E. Allen, “What is consciousness, and do we have free will?”, in G. Alexander et al., “The sounds of science—a symphony for many instruments and voices”, *Phys. Scr.* 95, 062501 (2020), <https://doi.org/10.1088/1402-4896/ab7a35>.
- [3] Suzy Lidström and Roland E. Allen, “Toward a physics description of consciousness”, *Eur. Phys. J. Spec. Top.* 230, 1081 (2021), <https://doi.org/10.1140/epjs/s11734-021-00097-x>.