

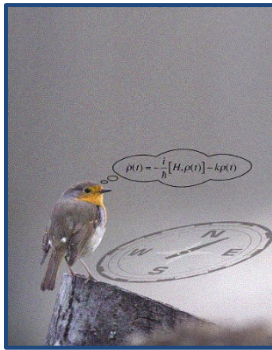
Thursday, April 8, 2021 | 3:00 PM – 4:00 PM

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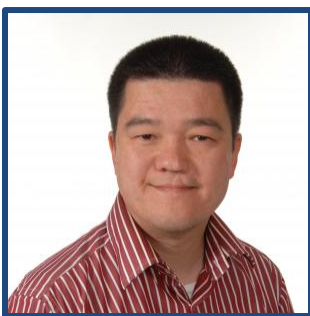
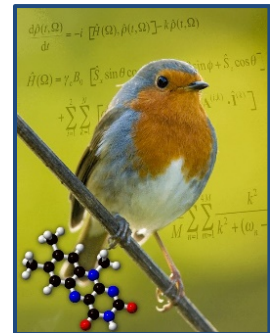
“Quantum Biology and the Magnetic Sense of Animals”

Presented by [Professor Thorsten Ritz](#)

Professor of Physics & Astronomy, University of California, Irvine



Recent studies of fundamental biological processes have drawn renewed attention to the possibility that living systems may exploit quantum effects such as tunneling or spin coherences even in the hot and wet environment of biological cells. As proposed originally 40 years ago, the dynamics of coherent spin states in radical-pair reactions can form the basis for a fundamentally quantum mechanical magnetic compass sensor in organisms. We will review the current theoretical questions regarding this mechanism, such as how to design a particularly sensitive receptor system, the role of noise, and extensions of the original model before turning to experimental evidence for this hypothesis. We will discuss the hurdles that have to be overcome to ultimately prove or disprove the now twenty year old suggestion that cryptochromes may be the magnetoreceptor molecule. We will discuss the open questions. The mechanism of magnetic sensing is perhaps the last true mystery of sensory biology; beyond its importance as a fundamental scientific problem, we will highlight directions of harnessing the interplay between the seemingly disparate world of classical and quantum physics for creating new technological tools.



Thorsten Ritz is an Associate Professor of Physics and Astronomy at the University of California, Irvine. He studied Physics at the JW Goethe University in Frankfurt, Germany, and went to graduate school at the University of Illinois at Urbana-Champaign and the University of Ulm, in Germany, earning a Ph.D. in Physics in 2001. He joined the faculty of UC Irvine in April 2003. His main research focus is in biophysics, in particular the study of magnetic sensing in animals, for which he has received national and international recognition. He was named Fellow of the Royal Institute of Navigation (UK), Fellow of the Institute of Physics (UK), Fellow of the Alfred P. Sloan Foundation, Cottrell Scholar of the Research Cooperation, and Distinguished Assistant Professor for Research at UC Irvine.

Department of Mechanical Engineering

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