



Im Rahmen des Physikkolloquiums spricht

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über

Photosynthetic Excitation Energy Transfer in Light of Quantum Biology Revolution

Abstract:

In recent years, experimental progress in time-resolved visible and near infrared spectroscopy has motivated a complete rethinking of the concept of excitation energy transfer in photosynthetic systems. Theories of energy transfer once considered as well established and sufficient have been challenged by claims of direct observations of non-trivial quantum effects in photosynthetic complexes. Standard theory was deemed to be classical (in a sense of ignoring important quantum effects), while new quantum theories were proposed. The new paradigm made it quickly into public lectures and popular literature, and even onto the TV screens. But is there anything to it, really? In this seminar I will revisit the problem from a perspective of a classical theory of photosynthetic energy transfer, to demonstrate, where the line between quantum and classical nature of photosynthetic energy transfer might lie. I will question that one can decide on the (quantum vs. classical) nature of certain effects directly from an experiment. I will demonstrate that the well established theories of the past include all it takes to describe the quantumness of photosynthetic systems, which was never ignored in the first place. We will also discuss what is needed for reconciliation between the theory and experiment, and what is the current understanding of the role of quantum effects in biological light-harvesting.