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seminar series

Peter Hore

Department of Chemistry,
University of Oxford, UK

A chemical compass: how migratory birds may navigate

September 24, 2015

Thursday, 16:00-17:00

Seminar room 132, pavilion A11
University campus Bohunice

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Migratory birds travel spectacular distances each year, navigating and orienting by a variety of means, most of which are poorly understood. Among them is a remarkable ability to perceive the intensity and direction of the Earth's magnetic field. Biologically credible mechanisms for sensing such weak fields are scarce and in recent years just two proposals have emerged as frontrunners. One, essentially classical, involves clusters of iron-containing particles. The other relies on magnetically sensitive chemistry. The latter began to attract interest following the proposal in 2000 that photochemically formed flavin-tryptophan radical pairs in cryptochrome proteins in the retina could be responsible. The quantum spin dynamics of such transient reaction intermediates is conjectured to lead to changes in the yield of the signalling state of the protein even though the interaction with the geomagnetic field is six orders of magnitude smaller than the thermal energy per molecule.

In this talk, Peter Hore will outline the basis of the radical pair mechanism, present some of the experimental evidence for the cryptochrome hypothesis and comment on the extent to which cryptochromes are fit-for-purpose as magnetoreceptors.

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