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An open quantum systems approach to magnetoreception

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Abstract content
   (Max 300 words)
Formatting &
Special chars

The emerging field of Quantum Biology centres on the possibility that living things might employ nontrivial quantum effects in their day to day behaviour. This surprising result has given rise to the investigation of such quantum effects in areas as diverse as photosynthesis and magnetoreception. In the case of avian magnetoreception, experiment supports the role of a radical pair mechanism in how birds sense the magnetic field. Following from radical pair theory and using the theory of open quantum systems we have completed the analytical derivation of the master equation in the Born-Markov approximation for the simple case of two electrons, each interacting with an environment of N nuclear spins as well as the external magnetic field, then placed in a boson bath and allowed to dissipate. We have then solved the master equation and analysed the dynamics of the radical pair.

Apply to be
 considered for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

MSc

Main supervisor (name and email)
and his / her institution

Professor Francesco Petruccione,
University of KwaZulu Natal

Would you like to <br> submit a short paper <br> for the Conference
 Proceedings (Yes / No)?

Yes

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