Universität Innsbruck - Institut für Christliche Philosophie

Gastvortrag

Organisation und Kontakt: Josef Quitterer

Michael John Brownnutt (Innsbruck):

A tutorial on Quantum Mechanics for Philosophers

Mittwoch, 17. Oktober 2012, 18.00 s.t.
Seminarraum VI (Karl-Rahner-Platz 3, 1. Stock)

There exist numerous ideas of how quantum mechanics may be invoked to explain free will. Considering possible quantum workings in the brain, recent work has shown that the Heisenberg uncertainty principle does not allow sufficient uncertainty to be implicated in synaptic function. I argue that while this may indeed be true, quantum mechanics has more tricks available to it than Heisenberg-limited uncertainty.
While quantum mechanics (justifiably) appears rather strange, there are certain basic concepts which can transform a seemingly magic black box into something relatively comprehensible. Starting from simple wave mechanics my talk will take a tutorial approach aiming to demystify at least some aspects of the quantum world. It will then consider some concrete examples of quantum systems in biology and argue that, while it is not clear that quantum mechanics plays a role in free will, it is also not clear that it does not. To take such discussions further, physicists will have to learn more philosophy and philosophers must learn more physics.

Mike Brownnutt: 2007 Ph.D. in Physics (Imperial College London; Thesis: 88Sr+ ion trapping techniques and technologies for quantum information processing), since 2007 post-doctoral researcher and university assistant at the Institut für Experimentalphysik, Universität Innsbruck.
Research: Mike Brownnutt wants to know how to scale up quantum computers. It is currently possible to realise basic quantum operations with about ten ions. However, just putting lots of these systems together brings technical and fundamental problems, which prevents us from going to 20 ions (let alone a million ions) without radically rethinking what we do. Scaling traps to hold more ions (in 1D and then in 2D) requires new ways of creating and changing the trap potentials. Miniaturising traps puts (cold, charged) ions to be closer to the (hot) electrodes and (unpredictable) dielectrics. This necessitates cryogenic traps and further research.

Alle Interessent/innen sind herzlich eingeladen!