

## **EINLADUNG**

zum Vortrag  
von

**Dr. Michael D. Towler**

TCM Group, Cavendish Laboratory, Cambridge University, UK

# **The quantum theory of de Broglie and Bohm: a challenge to orthodox quantum mechanics**

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**Dienstag, 23. November 2010, um 17.00 Uhr**

Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,  
1090 Wien, Strudlhofgasse 4 / Boltzmannngasse 5, 1. Stock

*Barrierefreier Zugang: Boltzmannngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals*

### **Abstract:**

De Broglie-Bohm theory is a 'hidden variables' formulation of quantum mechanics initially developed by Louis de Broglie from 1923-1927 and clarified and extended by American physicist David Bohm beginning in 1952. Just by the simple expedient of refusing to believe that particles cease to exist if you stop looking at them, it is easy to show that - contrary to popular belief - quantum mechanics can be interpreted as a dynamical theory of particle trajectories rather than as a statistical theory of observation. In such a formalism the standard paradoxes related to measurement, observation and wave function collapse (Schroedinger's cat, and so on) largely evaporate. The classical limit does not have to be presupposed and emerges from the theory in a relatively clear way. All the 'talk' is replaced by sharply-defined mathematics, it becomes possible to 'visualize' the reality of most quantum events, and - most importantly - the theory is completely consistent with the full range of QM predictive-observational data. The theory also gives rise to the possibility of new physics - and of new mathematical and philosophical ideas - and is currently undergoing a major resurgence. In this talk I review the structure of the theory and its consequences, and present some recent non-equilibrium trajectory calculations which demonstrate the origin of the Born rule and may hold the key to possible experimental tests of the de Broglie-Bohm framework.

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