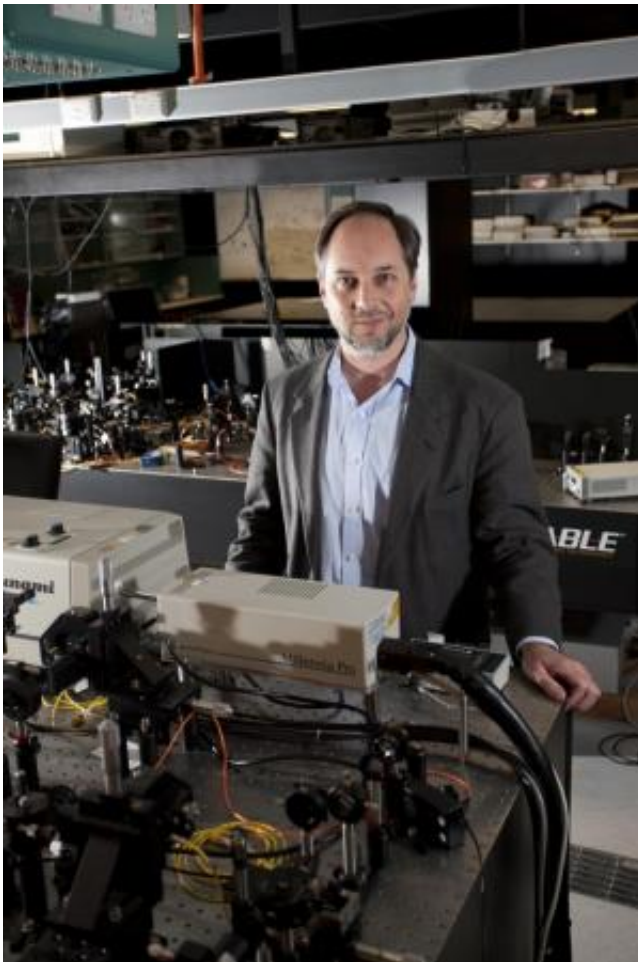


Many Interacting Worlds theory: Scientists propose existence and interaction of parallel worlds

October 30 2014



Professor Howard Wiseman, Director of Griffith University's Centre for Quantum Dynamics. Credit: Griffith University

Griffith University academics are challenging the foundations of quantum science with a radical new theory based on the existence of, and interactions between, parallel universes.

In a paper published in the prestigious journal *Physical Review X*, Professor Howard Wiseman and Dr Michael Hall from Griffith's Centre for Quantum Dynamics, and Dr Dirk-Andre Deckert from the University of California, take interacting parallel worlds out of the realm of science fiction and into that of hard science.

The team proposes that parallel universes really exist, and that they interact. That is, rather than evolving independently, nearby worlds influence one another by a subtle force of repulsion. They show that such an interaction could explain everything that is bizarre about [quantum mechanics](#)

Quantum theory is needed to explain how the universe works at the microscopic scale, and is believed to apply to all matter. But it is notoriously difficult to fathom, exhibiting weird phenomena which seem to violate the laws of cause and effect.

As the eminent American theoretical physicist Richard Feynman once noted: "I think I can safely say that nobody understands quantum mechanics."

However, the "Many-Interacting Worlds" approach developed at Griffith University provides a new and daring perspective on this baffling field.

"The idea of [parallel universes](#) in quantum mechanics has been around since 1957," says Professor Wiseman.

"In the well-known "Many-Worlds Interpretation", each universe branches into a bunch of new universes every time a quantum

measurement is made. All possibilities are therefore realised – in some universes the dinosaur-killing asteroid missed Earth. In others, Australia was colonised by the Portuguese.

"But critics question the reality of these other universes, since they do not influence our universe at all. On this score, our "Many Interacting Worlds" approach is completely different, as its name implies."

Professor Wiseman and his colleagues propose that:

- The universe we experience is just one of a gigantic number of worlds. Some are almost identical to ours while most are very different;
- All of these worlds are equally real, exist continuously through time, and possess precisely defined properties;
- All quantum phenomena arise from a universal force of repulsion between 'nearby' (i.e. similar) worlds which tends to make them more dissimilar.

Dr Hall says the "Many-Interacting Worlds" theory may even create the extraordinary possibility of testing for the existence of other worlds.

"The beauty of our approach is that if there is just one world our theory reduces to Newtonian mechanics, while if there is a gigantic number of worlds it reproduces quantum mechanics," he says.

"In between it predicts something new that is neither Newton's theory nor [quantum theory](#).

"We also believe that, in providing a new mental picture of quantum effects, it will be useful in planning experiments to test and exploit [quantum phenomena](#)."

The ability to approximate quantum evolution using a finite number of worlds could have significant ramifications in molecular dynamics, which is important for understanding chemical reactions and the action of drugs.

Professor Bill Poirier, Distinguished Professor of Chemistry at Texas Tech University, has observed: "These are great ideas, not only conceptually, but also with regard to the new numerical breakthroughs they are almost certain to engender."

More information: *Physical Review X*, [journals.aps.org/prx/abstract/... 03/PhysRevX.4.041013](https://journals.aps.org/prx/abstract/10.1103/PhysRevX.4.041013)

Provided by Griffith University

Citation: Many Interacting Worlds theory: Scientists propose existence and interaction of parallel worlds (2014, October 30) retrieved 1 May 2024 from <https://phys.org/news/2014-10-interacting-worlds-theory-scientists-interaction.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.