

# Qubit link could pave the way for first quantum computers

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Scientists at The University of Manchester have made a major breakthrough which could pave the way for a new type of high-speed computer.

Professor Richard Winpenny, of the School of Chemistry and a team of international researchers, have discovered a new method which could hold the key to creating the first practical quantum computers.

If built, quantum computers would be the most powerful computers ever made, with speeds millions of times faster than the average PC for some calculations. These speeds would be valuable in factoring large numbers, and therefore extremely useful for encrypting information.

Professor Richard Winpenny and the research team have for the first time demonstrated how qubit rings, pieces of quantum information, can be linked together.

The breakthrough, which results from three years research, opens up the possibility of being able to create quantum gates - a more advanced version of processors found in modern computers.

Professor Winpenny, said: "Linking these molecules not only gives us a much better understanding of how these molecules interact but it also gives us more control over how they interact, which is essential if we are to ever successfully implement quantum gates.

"This is the start rather than the finish in terms of the development of a

quantum computer, but now that we have shown we can do this, it gives us clear targets."

The full results of the research will be published in issue 40 of the Chemistry Journal *Angewandte Chemie*. The Paper is entitled: "Linking Rings through Diamines and Clusters: Exploring Synthetic Methods for Making Magnetic Quantum Gates."

The research, which was funded by the Engineering and Physical Sciences Research Council (EPSRC), the Royal Society and the European Commission, was carried out in collaboration with The Italian National Institute for the Physics of Matter (Modena) and the Centre National de la Recherche Scientifique (Grenoble). Key to the collaboration is a European funded Network of Excellence MagmaNet - which has recently been founded to underpin research in molecular magnetism.

Source: University of Manchester

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