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Quantum paper among most cited worldwide

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The paper "Unconditional quantum teleportation" published in Science (1998) has been ranked number 59 among most cited papers in physics worldwide in the past 10 years with more than 1000 citations and it is number one cited paper in Danish physics in the past 10 years.

Quantum teleportation is an attractive subject for the public mainly because of the Star Trek. In modern physics, however, quantum teleportation has become one of the main building blocks for quantum information processing (QIP). QIP deals with quantum states which cannot be transferred from one place to another by means of regular communication channels. Quantum teleportation is precisely the method to transfer such quantum states – paving the road towards quantum Internet of the future.

In 1998 the first experiment reporting unconditional quantum teleportation has been performed by a team of scientists from USA, UK and Denmark. The paper "Unconditional quantum teleportation" A. Furusawa, J.L.Sørensen, S.L. Braunstein, C.A.Fuchs, H.J.Kimble and E.S.Polzik was published in Science 282, 706 (1998).

Important milestones

In the experiment researchers teleported a quantum state of light from one beam of light onto another. Light, of course, can propagate without any teleportation, so the practical implications of that experiment were limited. However, this experiment demonstrated proof of principle and triggered a large number of other publications.

Exactly how large has been the impact of that paper is evident now, ten years later. The article on quantum teleportation has been ranked number 59 among most cited papers in physics worldwide in the past 10 years by ISI Web of Knowledge. This work has been cited by other researcher in more than 1000 articles. According to Essential Science Indicators it is number one cited paper in Danish physics in the past 10 years.

Research on quantum teleportation has achieved several milestones in the past ten years. Quantum teleportation between two ions has been demonstrated by scientists in the US and in Austria in 2004. Quantum teleportation between light and matter has been demonstrated by researchers at the Niels Bohr Institute in 2006. Future challenges include, among other things, long distance quantum teleportation between material objects.

Contact: [Gertie Skaarup](#), skaarup@nbi.dk

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Experiments with quantum teleportation using laser beams.