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Professor John Rarity graduated from Sheffield University with with, BSc Hons in Physics in 1975. He went on to an MSc in Biophysics and Bioengineering at Chelsea College, London 1976-8 and a PhD (1984) at the Royal Military College of Science, Shrivenham (now Cranfield). He went on to work in the area of Dynamic light scattering at the Royal Signals and Radar Establishment (now QinetiQ) in 1982. His field shifted in the late 1980's to the study of quantum interference effects particularly the counter intuitive interference effects involving two particles known as entanglement. The discovery and his subsequent development of quantum cryptography, a way of distributing keys over optical channels in absolute security using single photon interference effects was the first application in the emerging field of Quantum Information Science. This work established Prof Rarity as a world leader in the areas of low light level and single photon optics, and quantum communications. It led to the award of the Thomas Young Medal from the institute of physics in 1995. He joined Bristol University in January 2003 as Professor of Optical Communications. Recent research successes have been the development of pair photon sources in photonic crystal fibres, a compact low cost quantum secured key exchange system for securing consumer transactions, significant contributions to long range (144km) quantum communications experiments and realisations of quantum gates for photons. In all Prof Rarity has published over 90 journal papers, edited 3 books, co-organised 4 European summer schools/workshops (IESC Cargese Corsica) and has participated in and co-ordinated European research projects continuously for 18 years, including the Descartes prize winner in 2004/5 (Qucomm). The cultural impact of his work has been demonstrated by various popular articles, reviews and innumerable invited lectures at Universities World-wide. His work has featured on television, notably Tomorrows World (1992), Horizon (1996), Channel 5 News (1997) and Discovery Channel (1998).

Most Relevant Research Publications:

- J G RARITY AND P R TAPSTER, Experimental violation of Bell's inequality based on phase and momentum, Phys Rev Letts, 64, 1990, 2495.
- P R TAPSTER, J G RARITY, and P C M OWENS, A violation of Bell's inequality over 4km of optical fibre, Phys Rev Letts, 73 1994, 1923.
- A K EKERT, J G RARITY, P R TAPSTER and G M Palma, Practical Quantum Cryptography based on Two-Photon Entanglement, Phys Rev Letts, 69, 1992, 1293-1295.
- P D TOWNSEND, J G RARITY and P R TAPSTER, Single photon interference in a 10km long optical fibre interferometer, Electronics Letters 29, 1993, 634-5.

- J.G.RARITY, P.R.Tapster, T.E.Wall, Single photon counting for 1300-1600nm using Peltier cooled and passively quenched InGaAs avalanche photodiodes, Applied Optics, 39, 6746-6753, 2000 .
- C. Kurtseifer, M. Halder, P. Zarda, H. Weinfurter, P.R. Tapster and J.G. RARITY, Quantum secure key exchange between mountains: a step towards a global key distribution system, Nature, 419, 450 (2002).
- J.G. RARITY, P.M. Gorman, P.R. Tapster and P. Knight, Ground to satellite secure key exchange using quantum cryptography New Journal of Physics New Journal of Physics 4, 82, 2002.
- J G Rarity, J Fulconis, J Duligall, WJ Wadsworth , PS Russell, Source of photon pairs in photonic crystal fibre, Optics Express **13**, 534, 2005
- J L Duligall, M S Godfrey, K A Harrison, W J Munro and J.G. Rarity, Low Cost and Compact Quantum Key Distribution, New J. Phys. **8**, 267 (2006)
- J. Fulconis, O. Alibart, J. O'Brien, W. Wadsworth and J.G. Rarity, "Micro-structured fibres – A versatile tool for quantum communications", quant-ph/0611232, Phys. Rev. Letts. **99**, 120501 (2007).
- A. Politi, M.J. Cryan, J.G. Rarity, S.Y. Yu and J.L O'Brien, Silica-on-silicon waveguide quantum circuits, Science, **320**, 646-649 (2008)