

List of Publications & Grants

Rainer Kaltenbaek

Reinlgasse 34/29
1140 Vienna, Austria
mobile: +43 664 1561372
web: www.maqro-mission.org
e-mail: rainer.kaltenbaek@univie.ac.at

List of Grants and Fellowships

- 2016 – 2019 **Principal Investigator** of ULE-Cavity-Access, research project funded by the Austrian Research Promotion Agency, Project No.: 854036, Funding: € 335,890.00
- 2016 – 2020 **Co-Proposer and Member of Management Committee** of COST Action QTSpace (CA 15220)
- 2013 – 2015 **Principal Investigator** of MAQROsteps, research project funded by the Austrian Research Promotion Agency, Project No.: 840089, Funding: € 197,200.00
- 09/2014 **Organizer & Co-PI** of MAQRO International Exploratory Workshop (Swiss National Science Foundation), Funding: CHF 9,750.00
- 2012 – 2014 **Initiator and project lead** of the ESA-funded project “Trapped nanoparticles for space experiments (NanoTrapS)”, Contract No.: 4000105799/127NL/Cbi, Funding: € 198,164.00
- 2011 – 2014 **Marie Curie Fellowship**, International Reintegration, European Commission, Funding: € 75,000.00
- 2011 – 2013 **APART fellowship**, Austrian Academy of Science, Funding: € 110,231.00
- 2011 – 2012 **Project lead** in the ESA-funded study “Macroscopic quantum resonators in space (MQES)”, Contract No.: Po P5401000400, Funding: € 50,000.00

Publication List

Publication record overview

29 peer-reviewed publications, 5 conference proceedings, 1 book chapter and 3 extensive technical reports for ESA-funded projects, 2 papers in preparation, h-Index: 17, 1270 citations¹.

Peer-reviewed publications

[OA] marks open-access publications

- 1) A. Pilan-Zanoni, J. Burkhardt, U. Johann, M. Aspelmeyer, R. Kaltenbaek, and G. Hechenblaikner. *Thermal performance of a radiatively cooled system for quantum optomechanical experiments in space*. *Appl. Therm. Engin.* **107**, 689 (2016) [OA]
- 2) R. Kaltenbaek et al. *Macroscopic Quantum Resonators (MAQRO): 2015 Update*. *EPJ Quantum Tech.* **3**, 5 (2016) [OA]

¹ ISI web of knowledge, 13.10.2016; orcid.org/0000-0002-9991-9919

- 3) G. Hechenblaikner, F. Hufgard, J. Burkhardt, N. Kiesel, U. Johann, M. Aspelmeyer, and R. Kaltenbaek. *How cold can you get in space? Quantum physics at cryogenic temperatures in space*. New J. Phys **16**, 013058 (2014) [OA]
- 4) N. Kiesel, F. Blaser, U. Delic, D. Grass, R. Kaltenbaek and M. Aspelmeyer. *Cavity cooling of an optically levitated submicron particle*. Proc. Natl. Acad. Sci. USA **110**(35), 14180 (2013) [OA]
- 5) M. D. Mazurek, K. M. Schreiter, R. Prevedel, R. Kaltenbaek, and K. J. Resch. *Dispersion-cancelled biological imaging with quantum-inspired interferometry*. Sci. Rep. **3**, 1582, doi: 10.1038/srep01582 (2013) [OA]
- 6) R. Kaltenbaek, G. Hechenblaikner, N. Kiesel, O. Romero-Isart, K. C. Schwab, U. Johann, and M. Aspelmeyer. *Macroscopic quantum resonators (MAQRO)*. Exp. Astron. **34**, 123 (2012) [OA]
- 7) K. Fisher, R. Prevedel, R. Kaltenbaek, and K. J. Resch. *Optimal linear optical implementation of a single-qubit damping channel*. New J. Phys. **14**, 033016 (2012) [OA]
- 8) M. Piani, D. Pitkanen, R. Kaltenbaek, and N. Lütkenhaus. *Linear-optics realization of channels for single-photon multimode qudits*. Phys. Rev. A **84**, 032304 (2011)
- 9) O. Romero-Isart, A. C. Pflanzer, F. Blaser, R. Kaltenbaek, N. Kiesel, M. Aspelmeyer, and J. I. Cirac. *Large Quantum Superpositions and Interference of Massive Nanometer-Sized Objects*. Phys. Rev. Lett. **107**, 020405 (2011)
- 10) Tzu-Chieh Wei, J. Lavoie, and R. Kaltenbaek. *Creating multiphoton-polarization bound entangled states*. Phys. Rev. A **83**, 033839 (2011)
- 11) R. Prevedel, Y. Lu, W. Matthews, R. Kaltenbaek, and K. J. Resch. *Entanglement-Enhanced Classical Communication Over a Noisy Classical Channel*. Phys. Rev. Lett. **106**, 110505 (2011)
- 12) R. Kaltenbaek, J. Lavoie, B. Zeng, S. D. Bartlett, and K. J. Resch. *Optical one-way quantum computing with a simulated valence-bond solid*. Nature Phys. **6**, 850 (2010)
- 13) J. Lavoie, R. Kaltenbaek, M. Piani, and K. J. Resch. *Experimental bound entanglement?* Nature Phys. **6**, 827 (2010)
- 14) Y. Lu, N. Coish, R. Kaltenbaek, D. R. Hamel, S. Croke, and K. J. Resch. *Minimum-error discrimination of entangled quantum states*. Phys. Rev. A **82**, 042340 (2010)
- 15) J. Lavoie, R. Kaltenbaek, M. Piani and K. J. Resch. *Experimental Bound Entanglement in a Four-Photon State*. Phys. Rev. Lett. **105**, 130501 (2010)
- 16) N. Killoran, D. N. Biggerstaff, R. Kaltenbaek, K. J. Resch, and N. Lütkenhaus. *Derivation and experimental test of fidelity benchmarks for remote preparation of arbitrary qubit states*. Phys. Rev. A **81**, 012334 (2010)

- 17) D. N. Biggerstaff, [R. Kaltenbaek](#), D. R. Hamel, G. Weihs, T. Rudolph, and K. J. Resch. *Cluster-State Quantum Computing Enhanced by High-Fidelity Generalized Measurements*. Phys. Rev. Lett. **103**, 240504 (2009)
- 18) K. M. Schreiter, A. Pasioka, [R. Kaltenbaek](#), K. J. Resch, and D.W. Kribs. *Optical implementation of a unitarily correctable code*. Phys. Rev. A **80**, 022311 (2009)
- 19) J. Lavoie, [R. Kaltenbaek](#), and K. J. Resch. *Experimental Violation of Svetlichny's inequality*. New J. Phys. **11**, 073051 (2009) [OA]
- 20) [R. Kaltenbaek](#), J. Lavoie, and K. J. Resch. *Classical Analogues of Two-Photon Quantum Interference*. Phys. Rev. Lett. **102**, 243601 (2009)
- 21) [R. Kaltenbaek](#), R. Prevedel, M. Aspelmeyer, and A. Zeilinger. *High-fidelity entanglement swapping with fully independent sources*. Phys. Rev. A **79**, 040302 (2009)
- 22) J. Lavoie, [R. Kaltenbaek](#), and K. J. Resch. *Quantum-optical coherence tomography with classical light*. Opt. Exp. **17**, 3818 (2009) [OA]
- 23) [R. Kaltenbaek](#), J. Lavoie, D. N. Biggerstaff, and K. J. Resch. *Quantum-inspired interferometry with chirped laser pulses*. Nature Phys. **4**, 864 (2008)
- 24) S. Gröblacher, T. Paterek, [R. Kaltenbaek](#), C. Brukner, M. Zukowski, M. Aspelmeyer, and A. Zeilinger. *An experimental test of non-local realism*. Nature **446**, 252 (2007)
- 25) S. Gröblacher, T. Paterek, [R. Kaltenbaek](#), C. Brukner, M. Zukowski, M. Aspelmeyer, and A. Zeilinger. *An experimental test of non-local realism*. Nature **446**, 871 (2007)
- 26) R. Prevedel, P. Walther, F. Tiefenbacher, P. Böhi, [R. Kaltenbaek](#), T. Jennewein, and A. Zeilinger. *High-speed linear optics quantum computing using active feed-forward*. Nature **445**, 65 (2007)
- 27) [R. Kaltenbaek](#), B. Blauensteiner, M. Zukowski, M. Aspelmeyer, and A. Zeilinger. *Experimental interference of independent photons*. Phys. Rev. Lett. **96**, 240502 (2006)
- 28) R. Ursin, R. Jennewein, M. Aspelmeyer, [R. Kaltenbaek](#), M. Lindenthal, P. Walther, and A. Zeilinger. *Communications – Quantum teleportation across the Danube*. Nature **430**, 849 (2004)
- 29) M. Aspelmeyer, H. R. Böhm, T. Gyatso, T. Jennewein, [R. Kaltenbaek](#), M. Lindenthal, G. Molina-Terriza, A. Poppe, K. J. Resch, M. Taraba, R. Ursin, P. Walther and A. Zeilinger. *Long-distance free-space distribution of quantum entanglement*. Science **301**, 621 (2003)

Articles in Conference Proceedings

- 1) [R. Kaltenbaek](#). *Testing quantum physics in space using high-mass matter-wave interferometry*. Proc. 50th Rencontres de Moriond, ed. E. Augé, J. Dumarchez, J. Trân Thanh Vân, pp. 141-144 arXiv: 1508.07796 (2015)
- 2) [R. Kaltenbaek](#). *Testing quantum physics in space using optically trapped nanospheres*. Proc. of SPIE **8810**, 88100B (2013)

- 3) K. J. Resch, H. Hübel, D. R. Hamel, A. Fedrizzi, S. Ramelow, T. Jennewein, J. Lavoie, R. Kaltenbaek, and M. Piani. *Photon triplets and bound entanglement*. IEEE ICO-IP, Ottawa (2011)
- 4) K. J. Resch, R. Kaltenbaek, J. Lavoie and D. N. Biggerstaff. *Chirped-pulse interferometry with finite frequency correlations*. Proc. of SPIE **7465**, 7465N (2009)
- 5) R. Kaltenbaek, M. Aspelmeyer, T. Jennewein, C. Brukner, A. Zeilinger, M. Pfennigbauer and W. R. Leeb. *Proof-of-concept experiments for quantum physics in space*. Proc. of SPIE **5161**, 252_(2003)

Chapters in books

- 1) R. Kaltenbaek and M. Aspelmeyer. *Optomechanical Schrödinger cats – a case for space*. In “Erwin Schrödinger – 50 Years After“, W. L. Reiter and J. Yngvason, editors, pages 123 – 132. New York: Wiley (2013). arXiv:1502.02876

Technical Reports

- 1) P. Schmid, U. Sezer, J. Horak, M. Aspelmeyer, M. Arndt, and R. Kaltenbaek. *Trapped nanoparticles in space experiments (NanoTrapS)*. Technical Report under Contract AO/1-6889/11/NL/CBi, ESA (2014).
- 2) R. Kaltenbaek, G. Hechenblaikner, N. Kiesel, F. Blaser, S. Gröblacher, S. Hofer, M. R. Vanner, W. Wiczorek, K. C. Schwab, U. Johann, and M. Aspelmeyer. *Macroscopic Quantum Experiments in Space (MQES)*. Technical Report under Contract Po P5401000400, ESA (2012).
- 3) M. Aspelmeyer, J. Jennewein, H. R. Böhm, Č. Brukner, R. Kaltenbaek, M. Lindenthal, G. Molina-Terriza, J. Petschinka, R. Ursin, P. Walther, A. Zeilinger, M. Pfennigbauer, and W. R. Leeb. *Quantum Communications in Space (QSpace)*. Technical Report under Contract 16358/02, ESA (2003).