Quantum Measurement Lab - Publication List
Michael R. Vanner

Last updated: January 4, 2021

arXiv Preprints

34. **Preparation and verification of two-mode mechanical entanglement through pulsed optomechanical measurements**
P. Neveu, J. Clarke, M. R. Vanner, E. Verhagen
arXiv:2011.10289 (2020).

33. **A master-equation treatment of nonlinear optomechanical systems with optical loss**
S. Qvarfort, M. R. Vanner, P. F. Barker, D. E. Bruschi
arXiv:2009.02295 (2020).

32. **Single-phonon addition and subtraction to a mechanical thermal state**
G. Enzian, J. J. Price, L. Freisem, J. Nunn, J. Janousek, B. C. Buchler, P. K. Lam, M. R. Vanner
arXiv:2006.11599 (2020).

Articles

31. **Coherent suppression of backscattering in optical microresonators**
A. Ø. Svela, J. M. Silver, L. Del Bino, S. Zhang, M. T. M. Woodley, M. R. Vanner, P. Del'Haye
Light: Science and Applications **9**, 204 (2020).

30. **Mechanical squeezing via fast continuous measurement**
C. Meng, G. A. Brawley, J. S. Bennett, M. R. Vanner, W. P. Bowen
Physical Review Letters **125**, 043604 (2020).

29. **Generating mechanical and optomechanical entanglement via pulsed interaction and measurement**
J. Clarke*, P. Sahium*, K. E. Khosla, I. Pikovski, M. S. Kim, M. R. Vanner
New Journal of Physics **22**, 063001 (2020).

28. **Quantum hypercube states**
L. A. Howard, T. J. Weinhold, F. Shahandeh, J. Combes, M. R. Vanner, A. G. White, M. Ringbauer
Physical Review Letters **123**, 020402 (2019).

27. **Observation of Brillouin optomechanical strong coupling with an 11 GHz mechanical mode**

G. Enzian, M. Szczykulska, J. Silver, L. Del Bino, S. Zhang, I. A. Walmsley, P. DelHaye, M. R. Vanner
Optica **6**, 7 (2019).

26. **Growing macroscopic superposition states via cavity quantum optomechanics**
J. Clarke, M. R. Vanner
Quantum Science and Technology **4**, 014003 (2019).

25. **Displacemon electromechanics: how to detect quantum interference in a nanomechanical resonator**
K. E. Khosla, M. R. Vanner, N. Ares, E. A. Laird
Physical Review X **8**, 021052 (2018).

24. **Generation of mechanical interference fringes by multi-photon quantum measurement**
M. Ringbauer, T. J. Weinhold, L. A. Howard, A. G. White, M. R. Vanner
New Journal of Physics **20**, 053042 (2018).

23. **Quantum magnetomechanics: Towards the ultrastrong coupling regime**
E. Romero-Sanchez, W. P. Bowen, M. R. Vanner, K. Y. Xia, J. Twamley
Physical Review B **97**, 024109 (2018).

22. **Quantum optomechanics beyond the quantum coherent oscillation regime**
K. Khosla, G. A. Brawley, M. R. Vanner, W. P. Bowen
Optica **4**, 1382 (2017).

21. **Amplified transduction of Planck-scale effects using quantum optics**
P. Bosso, S. Das, I. Pikovski, M. R. Vanner
Physical Review A **96**, 023849 (2017).

20. **Arbitrary multi-qubit generation**
F. Shahandeh, A. P. Lund, T. C. Ralph, M. R. Vanner
New Journal of Physics **18**, 103020 (2016).

19. **Quantum and classical phases in optomechanics**
F. Armata, L. Latmiral, I. Pikovski, M. R. Vanner, C. Brukner, M. S. Kim
Physical Review A **93**, 063862 (2016).

18. **Nonclassical-state generation in macroscopic systems via hybrid discrete-continuous quantum measurements**
T. J. Milburn, M. S. Kim, M. R. Vanner
Physical Review A **93**, 053818 (2016).

17. **A quantum optomechanical interface beyond the resolved sideband limit**
J. S. Bennett, K. Khosla, L. S. Madsen, M. R. Vanner, H. Rubinsztein-Dunlop, W. P. Bowen
New Journal of Physics **18**, 053030 (2016).

16. **Nonlinear optomechanical measurement of mechanical motion**
G. A. Brawley*, M. R. Vanner*, P. E. Larsen, S. Schmid, A. Boisen, W. P. Bowen
Nature Communications **7**, 10988 (2016).

15. **Towards optomechanical quantum state reconstruction of mechanical motion**
M. R. Vanner, I. Pikovski, M. S. Kim
Annalen der Physik **527**, 15 (2015).

14. **An opto-magneto-mechanical quantum interface between distant superconducting qubits**
Keyu Xia, Michael R. Vanner, and Jason Twamley
Scientific Reports **4**, 5571 (2014).

13. **Cooling-by-measurement and mechanical state tomography via pulsed optomechanics**
M. R. Vanner, J. Hofer, G. D. Cole, and M. Aspelmeyer
Nature Communications **4**, 2295 (2013).

12. **Quantum state preparation of a mechanical resonator using an optomechanical geometric phase**
K. E. Khosla, M. R. Vanner, W. P. Bowen, G. J. Milburn
New Journal of Physics **15**, 043025 (2013).

11. **Quantum state orthogonalization and a toolset for quantum optomechanical phonon control**
M. R. Vanner, M. Aspelmeyer, M. S. Kim
Phys. Rev. Lett. **110**, 010504 (2013).

10. **Probing Planck-scale physics with quantum optics**
Igor Pikovski, Michael R. Vanner, Markus Aspelmeyer, Myungshik Kim, Caslav Brukner
Nature Physics **8**, 393 (2012).

9. **Selective linear or quadratic optomechanical coupling via measurement**
M. R. Vanner
Phys. Rev. X **1**, 021011 (2011).

8. **Pulsed quantum optomechanics**
M. R. Vanner, I. Pikovski, G. D. Cole, M. S. Kim, C. Brukner, K. Hammerer, G. J. Milburn and M. Aspelmeyer
Proc. Natl. Acad. Sci. USA 108, 16182 (2011).

7. **Phonon-tunnelling dissipation in mechanical resonators**
Garrett D. Cole*, Ignacio Wilson-Rae*, Katharina Werbach, Michael R. Vanner, Markus Aspelmeyer
Nature Communications **2**, 231 (2011).

6. **Observation of strong coupling between a micromechanical resonator and an optical cavity field**
Simon Groblacher, Klemens Hammerer, Michael R. Vanner, Markus Aspelmeyer
Nature **460**, 724 (2009).

5. **Demonstration of an ultracold micro-optomechanical oscillator in a cryogenic cavity**
Simon Groblacher, Jared B. Hertzberg, Michael R. Vanner, Garrett D. Cole, Sylvain Gigan, Keith C. Schwab, Markus Aspelmeyer
Nature Physics **5**, 485 (2009).

4. **Broadband optical delay with large dynamic range using atomic dispersion**
M.R. Vanner, R.J. McLean, P. Hannaford and A.M. Akulshin
J. Phys. B: At. Mol. Opt. Phys. **41**, 051004 (2008).

3. **High-fidelity transmission of polarization encoded qubits from an entangled source over 100 km of fiber**
Hannes Hubel, Michael R. Vanner, Thomas Lederer, Bibiane Blauensteiner, Thomas Lorunser, Andreas Poppe and Anton Zeilinger
Optics Express **15**, 7853 (2007).

2. **Fabrication and characterization of face-centered-cubic void dots photonic crystals in a solid polymer material**
G. Zhou, M.J. Ventura, M.R. Vanner and M. Gu
Applied Physics Letters **86**, 011108 (2005).

1. **Use of ultrafast-laser-driven microexplosion for fabricating three-dimensional void-based diamond-lattice photonic crystals in a solid polymer material**
G. Zhou, M.J. Ventura, M.R. Vanner and M. Gu
Optics Letters **29**, 2240 (2004).

Peer-Reviewed Proceedings and Opinion Pieces

3. **Mechanical quantum systems controlled Nature News and Views**
M. R. Vanner
Nature **563**, 39 (2018).

2. **Megahertz monocrystalline optomechnaical resonators with minimal dissipation**
G. D. Cole, I. Wilson-Rae, M. R. Vanner, S. Groblacher, J. Pohl, M. Zorn. M. Weyers, A. Peters, and M. Aspelmeyer
23rd IEEE International Conference on Microelectromechanical Systems, Hong Kong SAR, China, 2428 January 2010, TP133
Proceedings of the IEEE International Conference on Micro Electro Mechanical Systems (MEMS), art. no. 5442339, pp. 847-850 (2010).

1. **Fabrication of three-dimensional void photonic crystals using ultrafast-laser-driven microexplosion in a solid polymer material**
Guangyong Zhou, Michael J. Ventura, Michael R. Vanner and M. Gu
Proc. SPIE **5635**, 129 (2005).

Patents

1. **An opto-magneto-mechanical quantum interface between distant superconducting qubits**
Keyu Xia, Michael R. Vanner, and Jason Twamley
PCT: WO2015127498 A1

Technical Articles

1. **Fabricating 3D microstructures and high-resolution imaging using NI LabVIEW**

M.R. Vanner, M. Straub and M. Gu
Invited National Instruments customer solutions article (2005)
Online version available at: http://sine.ni.com/csol/cds/item/vw/p/id/663/nid/124100