

Curriculum Vitae
Andrew P. Higginbotham

IST Austria
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Education and Experience

IST Austria, Assistant Professor — 2019-present

Research interests: superconducting circuits, hybrid superconductor-semiconductor devices, cavity optomechanics

Microsoft Station Q Copenhagen, Researcher & team leader — 2017-2019

Research topic: Topological superconductivity and quantum information

JILA: NIST and CU Boulder, Postdoctoral research — 2015-2017

Research topics: Quantum microwave-mechanical-optical transducer

Advisors: Konrad W. Lehnert & Cindy A. Regal

Harvard University, Ph.D. — 2010-2015

Traveling scholar at Niels Bohr Institute, DK

Research topics: Singlet-triplet spin qubits, quantum dots, topological superconductivity

Advisor: Charles M. Marcus

Cambridge University, M.Phil. — 2009-2010

Research topics: Automated material discovery, organic optical devices

Advisor: Jacqueline M. Cole

Harvey Mudd College, B.Sc. — 2005-2009

Research topics: laser-driven nuclear fusion, fluid mechanics

Advisor: Thomas D. Donnelly

Most important previous results:

-World-record efficiency, quantum-enabled microwave-optical converter (postdoc)

-Pioneered quantum-dot studies of topological superconductors (PhD)

-Developed new transport methods to search for topological superconductors (Microsoft)

Awards and Honors

National Research Council Postdoctoral Fellowship, 2016
D.O.E. Office of Science Graduate Fellowship, 2010
D.O.D. National Defense Science & Engineering Graduate Fellowship (declined), 2010
A.P.S. Apker Award Finalist, 2009
Churchill Foundation Scholarship (Cambridge, UK), 2009
D.O.D. National Defense Science & Engineering Graduate Fellowship (declined), 2009
Fannie and John Hertz Foundation Scholarship Finalist, 2009
Mindlin Prize for Innovation in Science (college), 2009
Thomas B. Brown Memorial Award (college), 2009
Bell Prize for Excellence in Physics (college), 2009

Articles

- End-to-end correlated subgap states in hybrid nanowires. G.L.R. Anselmetti, E.A. Martinez, G.C. Ménard, D. Puglia, F.K. Malinowski, J.S. Lee, S. Choi, M. Pendharkar, C.J. Palmstrøm, C.M. Marcus, L. Casparis, **A.P. Higginbotham**. arXiv:1908.05549 (2019).
- Nonlocal conductance spectroscopy of Andreev bound states: Symmetry relations and BCS charges. J. Danon, A.B. Hellenes, E.B. Hansen, L. Casparis, **A.P. Higginbotham**, K. Flensberg. arXiv: 1905.05438 (2019).
- Conductance-matrix symmetries of a three-terminal hybrid device. G.C. Ménard, G.L.R. Anselmetti, E.A. Martinez, D. Puglia, F.K. Malinowski, J.S. Lee, S. Choi, M. Pendharkar, C.J. Palmstrøm, K. Flensberg, C.M. Marcus, L. Casparis, **A.P. Higginbotham**. arXiv:1905.05505 (2019).
- A.P. Higginbotham**,* P.S. Burns,* M.D. Urmey,* R.W. Peterson, N.S. Kampel, B.M. Brubaker, G.C. Smith, K.W. Lehnert, C.A. Regal. Electro-optic correlations improve an efficient, microwave-mechanical-optical converter. *Nature Physics* **14**, 1038-1042 (2018).
- E.I. Rosenthal, N.K. Ehrlich, M.S. Rudner, A.P. Higginbotham, K.W. Lehnert. Topological phase transition measured in a dissipative metamaterial *Phys. Rev. B* **97**, 220301(R) (2018).
- E.I. Rosenthal, B.J. Chapman, **A.P. Higginbotham**, J. Kerckhoff, K.W. Lehnert. Breaking Lorentz reciprocity with frequency conversion and delay, *Phys. Rev. Lett.* **119**, 147703 (2017).

- T. Menke, P.S. Burns, **A.P. Higginbotham**, N.S. Kampel, R.W. Peterson, K. Cicak, R.W. Simmonds, C.A. Regal, K.W. Lehnert, Reconfigurable re-entrant cavity for wireless coupling to an electro-optomechanical device, *Review of Scientific Instruments* **88**, 094701 (2017).
- S.M. Albrecht, E.B. Hansen, **A.P. Higginbotham**, F. Kuemmeth, T.S. Jespersen, J. Nygård, P. Krogstrup, J. Danon, K. Flensberg, C.M. Marcus, Transport signatures of quasiparticle poisoning in a Majorana island, *Phys. Rev. Lett.* **118**, 137701 (2017).
- T. Menke, P.S. Burns, **A.P. Higginbotham**, N.S. Kampel, R.W. Peterson, K. Cicak, R.W. Simmonds, C.A. Regal, K.W. Lehnert, Reconfigurable re-entrant cavity for wireless coupling to an electro-optomechanical device, *Review of Scientific Instruments* **88**, 094701 (2017).
- J.M. Cole, T.-C. Lin, C.M. Ashcroft, J. Perez-Moreno, Y. Tan, P. Venkatesan, **A.P. Higginbotham**, P. Pattison, A.J. Edwards, R.O. Piltz, K. Clays, A. Ilangovan, Relating the Structure of Geminal Amido Esters to Their Molecular Hyperpolarizability, *J. Phys. Chem. C* **120**, 29439–29448 (2016).
- D. Aasen, M. Hell, R.V. Mishmash, **A.P. Higginbotham**, J. Danon, M. Leijnse, T.S. Jespersen, J.A. Folk, C.M. Marcus, K. Flensberg, and J. Alicea, Milestones toward Majorana-based quantum computing, *Phys. Rev. X* **6**, 031016 (2016).
- R.V. Mishmash, D. Aasen, **A.P. Higginbotham**, and J. Alicea, Approaching a topological phase transition in Majorana nanowires, *Phys. Rev. B* **93**, 245404 (2016).
- S.M. Albrecht,* **A.P. Higginbotham**,* M. Madsen, F. Kuemmeth, T. S. Jespersen, J. Nygård, P. Krogstrup, C.M. Marcus, Exponential protection of zero modes in Majorana islands, *Nature* **531**, 206–209 (2016).
- A.P. Higginbotham**,* S.M. Albrecht,* G. Kiršanskas, W. Chang, F. Kuemmeth, P. Krogstrup, T.S. Jespersen, J. Nygård, K. Flensberg, C.M. Marcus, Parity lifetime of bound states in a proximitized semiconductor nanowire, *Nature Physics* **11**, 1017–1021 (2015).
- A.P. Higginbotham**, T.W. Larsen, J. Yao, H. Yan, C.M. Lieber, C.M. Marcus, Hole Spin Coherence in a Ge/Si Heterostructure Nanowire, *Nano Lett.* **14**, 3582 (2014).
- A.P. Higginbotham**, F. Kuemmeth, T.W. Larsen, M. Fitzpatrick, J. Yao, H. Yan, C.M. Lieber, C.M. Marcus, Antilocalization of Coulomb Blockade in a Ge/Si Nanowire, *Phys. Rev. Lett.* **112**, 216806 (2014).
- A. P. Higginbotham**, F. Kuemmeth, M. P. Hanson, A. C. Gossard, C. M. Marcus, Coherent Operations and Screening in Multielectron Spin Qubits. *Phys. Rev. Lett.* **112**, 026801 (2014).

T-C. Lin, J. M. Cole, **A.P. Higginbotham**, A.J. Edwards, R.O. Piltz, J. Pérez-Moreno, J-Y. Seo, S-C. Lee, K. Clays, O-P. Kwon, Molecular Origins of the High-Performance Nonlinear Optical Susceptibility in a Phenolic Polyene Chromophore. *J. Phys. Chem. C*. **117**, 9416 (2013).

A.P. Higginbotham, J.M. Cole, M.A. Blood-Forsythe, D.D. Hickstein, Identifying and evaluating organic nonlinear optical materials via molecular moments, *J. Appl. Phys.* **111**, 033512 (2012).

A.P. Higginbotham, A. Guillen, N. Jones, T.D. Donnelly, A.J. Bernoff, Evidence of the harmonic Faraday instability in ultrasonic atomization experiments with a deep, inviscid fluid, *J. Acoust. Soc. Am.* **130**, 2694 (2011).

I.K. Wright, **A.P. Higginbotham**, S.M. Baker, T.D. Donnelly, Generation of nanoparticles of controlled size using ultrasonic piezoelectric oscillators in solution, *ACS Appl. Mater. Interfaces* **2**, 2360 (2010).

A.P. Higginbotham, O. Semonin, S. Bruce, C. Chan, M. Maindi, T.D. Donnelly, M. Maurer, W. Bang, I. Churina, J. Osterholz, I. Kim, A.C. Bernstein, T. Ditmire, Generation of Mie size microdroplet aerosols with applications in laser-driven fusion experiments, *Rev. Sci. Inst.* **80**, 063503 (2009).

Invited talks

“Approaching quantum operation of a microwave-mechanical-optical transducer.” *Physics of Quantum Electronics*, Snowbird UT (2017).

“Exponential localization of zero modes in Majorana islands.” *CNAM Condensed Matter Colloquium*, University of Maryland (2016).

“Microwave-mechanical-optical transducer in a dilution refrigerator.” *Quantum Interfaces with Nano-opto-electro-mechanical devices: Applications and Fundamental Physics*, Erice IT (2016).

“Exponential protection of zero modes in Majorana islands.” *Caltech Condensed Matter Seminar* (2015).

“Long spin coherence in a strong spin-orbit qubit.” *APS March Meeting Invited Talk* (2014).