Curriculum Vitae

Peter J. Brown

Personal Information

Email:	pjbrown2109@gmail.com
Scholar:	Publications/preprints
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Research Positions

Dec. 2019 - Present	Postdoctoral researcher, ENS de Lyon, France. Supervisor: Prof. Omar Fawzi.
May 2019 - Nov. 2019	Research Associate in Quantum Information Theory, University of York, UK. Supervisor: Dr. Roger Colbeck.

Education

Oct. 2015 - May 2019	PhD in Mathematics, University of York, UK. Thesis title: On constructions of quantum-secure device-independent randomness expansion protocols. Supervisor: Dr. Roger Colbeck.
Oct. 2011 - July 2015	MMath degree in Mathematics, University of York, UK. Thesis title: Negative energy densities in quantum field theory Supervisor: Prof. Christopher Fewster. Award: First Class
Sep. 2009 - Aug. 2011	A-Levels, Sunderland College, UK. Subjects: Mathematics, Further Mathematics, Biology. Grades: A*, A, A.

Publications and Preprints

- P. Brown, H. Fawzi and O. Fawzi, Device-independent lower bounds on the conditional von Neumann entropy. (2021) (arXiv)
- W-Z. Liu, M-H. Li, S. Ragy, S-R. Zhao, B. Bai, Y. Liu, P. Brown, J. Zhang, R. Colbeck, J. Fan, Q. Zhang and J-W. Pan, Device-independent randomness expansion against quantum side information. Nature Physics 17.4 (2021) (Journal / arXiv)
- A. Denys, P. Brown and A. Leverrier, Explicit asymptotic secret key rate of continuous-variable quantum key distribution with an arbitrary modulation. (2021) (arXiv)
- P. Brown, H. Fawzi and O. Fawzi, Computing conditional entropies for quantum correlations. Nature communications 12.1 (2021) (Journal / arXiv)
- P.J. Brown and R. Colbeck, Arbitrarily many independent observers can share the nonlocality of a single maximally entangled qubit pair. Physical Review Letters 125.9 (2020) (Journal / arXiv)
- P.J. Brown, S. Ragy and R. Colbeck, A framework for quantum-secure device-independent randomness expansion. IEEE Transactions on Information Theory, 66.5 (2020) (Journal / arXiv)
- P.J. Brown, C.J. Fewster and EA. Kontou, Classical and quantum strong energy inequalities and the Hawking singularity theorem. To appear in 15th Marcel Grossmann conference

proceedings (2019). (arXiv)

- P.J. Brown, C.J. Fewster and EA. Kontou, A singularity theorem for Einstein-Klein-Gordon theory. Gen Relativ Gravit (2018) 50: 121. (Journal / arXiv)

Talks and Seminars

Invited Talks and Seminars:

Aug. 2021 – eDICT workshop on device-independent cryptography – ETH Zurich
Title: Computing rates of device-independent protocols

Oct. 2020 – Düsseldorf Quantum Info online Seminars – Heinrich Heine University Düsseldorf
Title: Computing rates of device-independent protocols

Contributed Talks:

Aug. 2021 – QCRYPT 2021 (Online)
Title: Device-independent lower bounds on the conditional von Neumann entropy

Feb. 2021 – Quantum information days 2020 (Online)
Title: An unbounded number of independent observers can share the nonlocality of one half of a maximally entangled qubit pair

Jan. 2021 – QIP 2021 (Online / Plenary talk)
Title: New quantum Rényi divergences and their application to device-independent cryptography and quantum Shannon theory

Nov. 2020 – Q-Turn 2020 (Online)
Title: An unbounded number of independent observers can share the nonlocality of a single maximally entangled qubit pair

Jan. 2019 – Northern Quantum Meeting IV – University of Leeds, UK
Title: A framework for device-independent randomness expansion

Nov. 2018 – Q-Turn – Universidade Federal de Santa Catarina, Brazil
Title: A framework for device-independent randomness expansion

July 2018 – Quantum Roundabout – University of Nottingham, UK
Title: A framework for device-independent randomness expansion

Poster Presentations:

Jun. 2019 – SwissMap Workshop - Mathematical Physics meets Quantum Information
Title: A framework for device-independent randomness expansion

Aug. 2018 – QCRYPT 2018 – University of Science and Technology of China
Title: A framework for device-independent randomness expansion

Aug. 2018 – QuICC 2018 – University of York, UK
Title: A framework for device-independent randomness expansion

Apr. 2018 – QCALL Secure Quantum Communications school – Universidad de Vigo, Spain
Title: A framework for device-independent randomness expansion

Teaching Experience

Seminars

2019 – Algebra undergraduate seminars (16 hours).
– Calculus undergraduate seminars (16 hours).
2018 – Algebra undergraduate seminars (16 hours).
– Applied Probability undergraduate seminars (12 hours).
– Calculus undergraduate seminars - (16 hours).
2017 – Applied Probability undergraduate seminars (8 hours).
– Groups, Rings and Fields undergraduate seminars (8 hours).
2016 – Cryptography undergraduate seminars (16 hours).

Student Supervision

Apr. 2021 - July 2021 Mohamed Bassiouny (Master's internship)
Apr. 2020 - Aug. 2020 Uta Meyer (Master's internship / co-supervised with Omar Fawzi)

Academic Citizenship

Outreach

2019 – Quantum technologies ambassador - conduct physics classes in local schools promoting the study of quantum theory. (sponsored by the UK Quantum Communications Hub)
– Royal Institute's Masterclass Volunteer - helped with the running of sessions promoting mathematics to secondary school students.
2018 – STEM Fair volunteer – Ran stall discussing cryptography at Sunderland College STEM event.
2017 – Postgraduate seminar organiser – Organised and ran research seminars for postgraduate students within the mathematics department.

Reviews

- Refereed papers for journals: NPJ Quantum Information; Physical Review Letters; Physical Review Research; Quantum.
- Refereed submissions for conferences: QCRYPT; QIP

Funding and Awards

2020 – Anand Ramachandran Memorial Prize for the best PhD thesis in the Department of Mathematics.
2017 – KM Stott Memorial Prize for excellence in PhD research, University of York.
2016 – Departmental postgraduate teaching prize.
2015 – WW Smith Fund - PhD (3 years).
– PB Kennedy Prize for outstanding performance in Mathematics Masters degree, University of York.

Computing Skills

Proficient: Python, Mathematica
Adequate: OS - Linux/Windows, HPC - SGE/SLURM, Matlab, C++.