

Mario Berta

Publications

RWTH Aachen

marioberta.info

OVERVIEW

- Journal articles (peer-reviewed): 69
 - Conference proceedings (peer-reviewed): 30
 - Preprints: 20
 - Citations: 8630
 - H-Index: 41
- (according to Google Scholar as of November 21, 2025)
- **Physics:** Nature Physics, Nature Communications, Reviews of Modern Physics, Physical Review X, PRX Quantum, Physical Review Letters
 - **Mathematical Physics:** Communications in Mathematical Physics, Annales Henri Poincaré
 - **Information Theory:** IEEE Transactions on Information Theory
 - **Cryptography:** Advances in Cryptology — CRYPTO
 - **Optimization:** SIAM Journal on Optimization, Mathematical Programming

PREPRINTS UNDER REVIEW

- Gereon Kossmann, **Mario Berta**, René Schwonnek, *Routed Bell tests with arbitrarily many local parties*, arXiv:2510.08405.
- Tobias Rippchen, Ludovico Lami, Gerardo Adesso, **Mario Berta**, *Fundamental quality bound on optical quantum communication*, arXiv:2510.07121.
- Štěpán Šmíd, Richard Meister, **Mario Berta**, Roberto Bondesan, *Rapid mixing of quantum Gibbs samplers for weakly-interacting quantum systems*, arXiv:2510.04954.
- Aadil Oufkir, Yongsheng Yao, **Mario Berta**, *Strong converse exponent of channel interconversion*, arXiv:2509.15200.
- Gereon Kossmann, Julius Zeiss, Omar Fawzi, **Mario Berta**, *On approximate error correction for symmetric noise*, arXiv:2507.12326.
- Julius Zeiss, Gereon Kossmann, Omar Fawzi, **Mario Berta**, *Approximating fixed size quantum correlations in polynomial time*, arXiv:2507.12302.
- Michael X. Cao, Yongsheng Yao, **Mario Berta**, *Channel coding against quantum jammers via minimax*, arXiv:2505.11362.
- **Mario Berta**, Yongsheng Yao, *Strong converse exponents of partially smoothed Information measures*, arXiv:2505.06050.
- Filippo Girardi, Aadil Oufkir, Bartosz Regula, Marco Tomamichel, **Mario Berta**, Ludovico Lami, *Quantum umlaut information*, arXiv:2503.21479.
- Filippo Girardi, Aadil Oufkir, Bartosz Regula, Marco Tomamichel, **Mario Berta**, Ludovico Lami, *Umlaut information*, arXiv:2503.18910.

- Aditya Nema, Sreejith Sreekumar, **Mario Berta**, *One-shot multiple access channel simulation*, arXiv:2410.17198.
- Santiago Cifuentes, Samson Wang, Thais L. Silva, **Mario Berta**, Leandro Aolita, *Quantum computational complexity of matrix functions*, arXiv:2410.13937.
- **Mario Berta**, Yongsheng Yao, *Strong converse exponent of quantum dichotomies*, arXiv:2410.12576.
- Aadil Oufkir, Yongsheng Yao, **Mario Berta**, *Exponents for classical-quantum channel simulation in purified distance*, arXiv:2410.10770.
- Aadil Oufkir, Omar Fawzi, **Mario Berta**, *Optimality of meta-converse for channel simulation*, arXiv:2410.08140.
- Aadil Oufkir, Michael X. Cao, Hao-Chung Cheng, **Mario Berta**, *Exponents for shared randomness-assisted channel simulation*, arXiv:2410.07051.
- Aadil Oufkir, Marco Tomamichel, **Mario Berta**, *Error exponent of activated non-signaling assisted classical-quantum channel coding*, arXiv:2410.01084.
- Sam McArdle, András Gilyén, **Mario Berta**, *Quantum state preparation without coherent arithmetic*, arXiv:2210.14892.
- Sam McArdle, András Gilyén, **Mario Berta**, *A streamlined quantum algorithm for topological data analysis with exponentially fewer qubits*, arXiv:2209.12887.
- **Mario Berta** and Fernando Brandão, *Robust randomness generation on quantum computers*, available at marioberta.info (2020).

REVIEW ARTICLES / BOOKS

- Alexander M. Dalzell *et al.* — **Mario Berta**, *Quantum algorithms: A survey of applications and end-to-end complexities*, Cambridge University Press (2025).
- **Mario Berta et al.**, *The tangled state of quantum hypothesis testing*, Nature Physics, 20, 172 (2024).
- Stefano Pirandola *et al.* — **Mario Berta**, *Advances in quantum cryptography*, Advances in Optics and Photonics 12, 1012 (2020).
- Patrick J. Coles, **Mario Berta**, Marco Tomamichel, Stephanie Wehner, *Entropic uncertainty relations and their applications*, Reviews of Modern Physics 89, 015002 (2017).

POPULAR ARTICLES

- **Mario Berta**, *Algorithmen für neue Hardware*, DPG Physik Journal 11 (2023), Schwerpunkt Quantencomputing, in German.
- Grant Salton *et al.* — **Mario Berta**, *Goldman Sachs and AWS examine efficient ways to load data into quantum computers*, AWS Quantum Computing Blog (2022).
- **Mario Berta**, *Generating quantum randomness with Amazon Braket*, AWS Quantum Computing Blog (2021).

JOURNAL ARTICLES

- Ludovico Lami, **Mario Berta**, Bartosz Regula, *Asymptotic quantification of entanglement with a single copy*, Nature Physics, accepted (2025).

- Štěpán Šmíd, Richard Meister, **Mario Berta**, Roberto Bondesan, *Polynomial time quantum Gibbs sampling for Fermi-Hubbard model at any temperature*, Nature Communications, to appear (2025).
- Sreejith Sreekumar, Christoph Hirche, Hao-Chung Cheng, **Mario Berta**, *Distributed quantum hypothesis testing under zero-rate communication constraints*, Annales Henri Poincaré, published online (2025).
- Aadil Oufkir, **Mario Berta**, *Quantum channel coding: Approximation algorithms and strong converse exponents*, Quantum 9, 1877 (2025).
- Tobias Rippchen, Sreejith Sreekumar, **Mario Berta**, *Locally-measured Rényi divergences*, IEEE Transactions on Information Theory 71, 6105 (2025).
- Sven Danz, **Mario Berta**, Stefan Schröder, Pascal Kienast, Frank K. Wilhelm, Alessandro Ciani, *Calculating response functions of coupled oscillators using quantum phase estimation*, Physical Review Research 7, 023264 (2025).
- **Mario Berta**, Hao-Chung Cheng, Li Gao, *Quantum broadcast channel simulation via multipartite convex splitting*, Communications in Mathematical Physics 406, 36 (2025).
- **Mario Berta**, Ludovico Lami, Marco Tomamichel, *Continuity of entropies via integral representations*, IEEE Transactions on Information Theory 71, 1896 (2025).
- Sreejith Sreekumar, **Mario Berta**, *Limit distribution theory for quantum divergences*, IEEE Transactions on Information Theory, 71, 459 (2025).
- Michael X. Cao, Navneeth Ramakrishnan, **Mario Berta**, Marco Tomamichel, *Channel simulation: Finite blocklengths and broadcast channels*, IEEE Transactions on Information Theory, 70, 6780 (2024).
- Samson Wang, Sam McArdle, **Mario Berta**, *Qubit-efficient randomized quantum algorithms for linear algebra*, PRX Quantum, 5, 020324 (2024).
- **Mario Berta**, Marco Tomamichel, *Entanglement monogamy via multivariate trace inequalities*, Communications in Mathematical Physics, 405, 29 (2024).
- Chi-Fang Chen, Alexander M. Dalzell, **Mario Berta**, Fernando Brandão, Joel A. Tropp, *Sparse random Hamiltonians are quantumly easy*, Physical Review X, 14, 011014 (2024).
- Alexander M. Dalzell *et al.* — **Mario Berta**, *End-to-end resource analysis for quantum interior point methods and portfolio optimization*, PRX Quantum, 4, 040325 (2023).
- **Mario Berta** *et al.*, *On a gap in the proof of the generalised quantum Stein’s lemma and its consequences for the reversibility of quantum resources*, Quantum, 7, 1103 (2023).
- Navneeth Ramakrishnan, Marco Tomamichel, **Mario Berta**, *Moderate deviation expansion for fully quantum tasks*, IEEE Transactions on Information Theory, 69, 5041 (2023).
- **Mario Berta**, David Sutter, Michael Walter, *Quantum Brascamp-Lieb dualities*, Communications in Mathematical Physics, 401, 1807 (2023).
- Cameron Foreman, Sherilyn Wright, Alec Edgington, **Mario Berta**, Florian J. Curchod, *Practical randomness and privacy amplification*, Quantum, 7, 969 (2023).
- David Clader, Alexander Dalzell, Nikitas Stamatopoulos, Grant Salton, **Mario Berta**, William Zeng, *Quantum resources required to block-encode a matrix of classical data*, IEEE Transactions on Quantum Engineering, 3, 1 (2023).

- Kianna Wan, **Mario Berta**, Earl T. Campbell, *A randomized quantum algorithm for statistical phase estimation*, Physical Review Letters, 129, 030503 (2022).
- **Mario Berta**, Francesco Borderi, Omar Fawzi, Volkher B. Scholz *Semidefinite programming hierarchies for constrained bilinear optimization*, Mathematical Programming, 194, 781 (2022).
- **Mario Berta**, Fernando Brandão, Christoph Hirche, *On composite quantum hypothesis testing*, Communications in Mathematical Physics 385, 55 (2021).
- Philippe Faist, **Mario Berta**, Fernando Brandão, *Thermodynamic implementations of quantum processes*, Communications in Mathematical Physics 384, 1709 (2021).
- Hyejung H. Jee, Carlo Sparaciari, **Mario Berta**, *Resource distillation in convex Gaussian resource theories*, Physical Review A 103, 022420 (2021).
- Navneeth Ramakrishnan, Raban Iten, Volkher B. Scholz, **Mario Berta**, *Computing quantum channel capacities*, IEEE Transactions on Information Theory 67, 946 (2021).
- Arkin Tikku, **Mario Berta**, Joseph M. Renes, *Non-additivity in classical-quantum wiretap channels*, IEEE Journal on Selected Areas in Information Theory 1, 526 (2020).
- Mark M. Wilde, **Mario Berta**, Christoph Hirche, Eneet Kaur, *Amortized channel divergence for asymptotic quantum channel discrimination*, Letters in Mathematical Physics 100, 2277 (2020).
- Anurag Anshu, **Mario Berta**, Rahul Jain, Marco Tomamichel, *Partially smoothed information measures*, IEEE Transactions on Information Theory 66, 5022 (2020).
- Kun Fang, Xin Wang, Marco Tomamichel, **Mario Berta**, *Quantum channel simulation and the channel's smooth max-Information*, IEEE Transactions on Information Theory 66, 2129 (2020).
- Anurag Anshu, **Mario Berta**, Rahul Jain, Marco Tomamichel, *A minimax approach to one-shot entropy inequalities*, Journal of Mathematical Physics 60, 122201 (2019).
- Philippe Faist, **Mario Berta**, Fernando Brandão, *Thermodynamic capacity of quantum processes*, Physical Review Letters 122, 200601 (2019).
- **Mario Berta**, Fernando Brandão, Jutho Haegeman, Volkher B. Scholz, Frank Verstraete, *Thermal states as convex combinations of matrix product states*, Physical Review B 98, 235154 (2018).
- **Mario Berta**, Christian Majenz, *Disentanglement cost of quantum states*, Physical Review Letters 121, 190503 (2018).
- **Mario Berta**, Fernando Brandão, Christian Majenz, Mark M. Wilde, *Deconstruction and conditional erasure of quantum correlations*, Physical Review A 98, 042320 (2018).
- **Mario Berta**, Fernando Brandão, Christian Majenz, Mark M. Wilde, *Conditional decoupling of quantum information*, Physical Review Letters 121, 040504 (2018).
- **Mario Berta**, Mark M. Wilde, *Amortization does not enhance the max-Rains information of a quantum channel*, New Journal of Physics 20, 053044 (2018).
- **Mario Berta**, Volkher B. Scholz, Marco Tomamichel, *Rényi divergences as weighted non-commutative vector valued L_p -spaces*, Annales Henri Poincaré 19, 1843 (2018).

- David Sutter, **Mario Berta**, Marco Tomamichel, *Multivariate trace inequalities*, Communications in Mathematical Physics 352, 37 (2017).
- **Mario Berta**, Omar Fawzi, Marco Tomamichel, *On variational expressions for quantum relative entropies*, Letters in Mathematical Physics 107, 2239 (2017).
- Mark M. Wilde, Marco Tomamichel, Seth Lloyd, **Mario Berta**, *Gaussian hypothesis testing and quantum illumination*, Physical Review Letters 119, 120501 (2017).
- **Mario Berta**, Hrant Gharibyan, Michael Walter, *Entanglement-assisted capacities of compound quantum channels*, IEEE Transactions on Information Theory 63, 3306 (2017).
- Christian Majenz, **Mario Berta**, Frédéric Dupuis, Renato Renner, Matthias Christandl, *Catalytic decoupling of quantum information*, Physical Review Letters 118, 080503 (2017).
- **Mario Berta**, Omar Fawzi, Volkher B. Scholz, *Quantum-proof randomness extractors via operator space theory*, IEEE Transactions on Information Theory 63, 2480 (2017).
- Mark M. Wilde, Marco Tomamichel, **Mario Berta**, *Converse bounds for private communication over quantum channels*, IEEE Transactions on Information Theory 63, 1792 (2017).
- **Mario Berta**, Omar Fawzi, Volkher B. Scholz, *Quantum bilinear optimization*, SIAM Journal on Optimization 26, 1529 (2016).
- **Mario Berta**, Stephanie Wehner, Mark M. Wilde, *Entropic uncertainty and measurement reversibility*, New Journal of Physics 18, 073004 (2016).
- Marco Tomamichel, **Mario Berta**, Joseph M. Renes, *Quantum coding with finite resources*, Nature Communications 7, 11419 (2016).
- **Mario Berta**, Marco Tomamichel, *The fidelity of recovery is multiplicative*, IEEE Transactions on Information Theory 62, 1758 (2016).
- **Mario Berta**, Matthias Christandl, Dave Touchette, *Smooth entropy bounds on one-shot quantum state redistribution*, IEEE Transactions on Information Theory 62, 1425 (2016).
- **Mario Berta**, Fabian Furrer, Volkher B. Scholz, *The smooth entropy formalism for von Neumann algebras*, Journal of Mathematical Physics 57, 015213 (2016), Special Issue: Operator Algebras and Quantum Information Theory.
- **Mario Berta**, Marius Lemm, Mark M. Wilde, *Monotonicity of quantum relative entropy and recoverability*, Quantum Information and Computation 15, 1333 (2015).
- Kaushik P. Seshadreesan, **Mario Berta**, Mark M. Wilde, *Rényi squashed entanglement, discord, and relative entropy differences*, Journal of Physics A 48, 395303 (2015).
- **Mario Berta**, Kaushik P. Seshadreesan, Mark M. Wilde, *Rényi generalizations of the conditional quantum mutual information*, Journal of Mathematical Physics 56, 022205 (2015).
- **Mario Berta**, Kaushik P. Seshadreesan, Mark M. Wilde, *Rényi generalizations of quantum information measures*, Physical Review A 91, 022333 (2015).
- Marco Tomamichel, **Mario Berta**, Masahito Hayashi, *Relating different quantum generalizations of the conditional Rényi entropy*, Journal of Mathematical Physics 55, 082206 (2014).

- Fabian Furrer, **Mario Berta**, Marco Tomamichel, Volkher B. Scholz, Matthias Christandl, *Position-momentum uncertainty relations in the presence of quantum memory*, Journal of Mathematical Physics 55, 122205 (2014).
- **Mario Berta**, Patrick J. Coles, Stephanie Wehner, *Entanglement-assisted guessing of complementary measurement outcomes*, Physical Review A 90, 062127 (2014).
- **Mario Berta**, Joseph M. Renes, Mark M. Wilde, *Identifying the information gain of a quantum measurement*, IEEE Transactions on Information Theory 60, 7987 (2014).
- **Mario Berta**, Omar Fawzi, Stephanie Wehner, *Quantum to classical randomness extractors*, IEEE Transactions on Information Theory 60, 1168 (2014).
- Frédéric Dupuis, **Mario Berta**, Jürg Wullschleger, Renato Renner, *One-shot decoupling*, Communications in Mathematical Physics 328, 251 (2014).
- **Mario Berta**, Fernando Brandão, Matthias Christandl, Stephanie Wehner, *Entanglement cost of quantum channels*, IEEE Transactions on Information Theory 59, 6779 (2013).
- Fabian Furrer, Torsten Franz, **Mario Berta**, Anthony Leverrier, Volkher B. Scholz, Marco Tomamichel, Reinhard F. Werner, *Continuous variable quantum key distribution: finite-key analysis of composable security against coherent attacks*, Physical Review Letters 109, 100502 (2012).
- Nelly Huei Ying Ng, **Mario Berta**, Stephanie Wehner, *A min-entropy uncertainty relation for finite size cryptography*, Physical Review A 86, 042315 (2012).
- **Mario Berta**, Matthias Christandl, Renato Renner, *The quantum reverse Shannon theorem based on one-shot information theory*, Communications in Mathematical Physics 306, 579 (2011).
- **Mario Berta**, Matthias Christandl, Roger Colbeck, Joseph M. Renes, Renato Renner, *The uncertainty principle in the presence of quantum memory*, Nature Physics 6, 659 (2010).

CONFERENCE PROCEEDINGS

- Shao-Lun Huang, Tobias Rippchen, **Mario Berta**, *Quantum entropy prover*, IEEE International Symposium on Information Theory, online (2025).
- Sreejith Sreekumar, Christoph Hirche, Hao-Chung Cheng, **Mario Berta**, *Distributed quantum hypothesis testing under zero-rate communication constraints*, IEEE International Symposium on Information Theory, online (2025).
- Aadil Oufkir, Michael X. Cao, Hao-Chung Cheng, **Mario Berta**, *Exponents for shared randomness-assisted channel simulation*, IEEE International Symposium on Information Theory, online (2025).
- **Mario Berta**, Lampros Gavalakis, Ioannis Kontoyiannis, *A third information-theoretic approach to finite de Finetti theorems*, IEEE International Symposium on Information Theory, pages 73-78 (2024).
- Sreejith Sreekumar, **Mario Berta**, *Limit distribution for quantum relative entropy*, IEEE International Symposium on Information Theory, pages 333-338 (2024).
- Tobias Rippchen, Sreejith Sreekumar, **Mario Berta**, *Locally-measured Rényi divergences*, IEEE International Symposium on Information Theory, pages 351-356 (2024).

- **Mario Berta**, Omar Fawzi, Aadil Oufkir, *Optimality of meta-converse for channel simulation*, IEEE International Symposium on Information Theory, pages 1209-1214 (2024).
- Aditya Nema, Sreejith Sreekumar, **Mario Berta**, *One-shot multiple access channel simulation*, IEEE International Symposium on Information Theory, pages 2981-2986 (2024).
- Michael X. Cao, Navneeth Ramakrishnan, **Mario Berta**, Marco Tomamichel, *Broadcast channel simulation*, IEEE International Symposium on Information Theory, pages 1430-1435 (2023).
- Michael X. Cao, Navneeth Ramakrishnan, **Mario Berta**, Marco Tomamichel, *One-shot point-to-point channel simulation*, IEEE International Symposium on Information Theory, pages 796-801 (2022).
- **Mario Berta**, Marco Tomamichel, *Chain rules for quantum channels*, IEEE International Symposium on Information Theory, pages 2427-2432 (2022).
- Navneeth Ramakrishnan, Marco Tomamichel, **Mario Berta**, *Moderate deviation analysis for quantum state transfer*, IEEE Information Theory Workshop (2021).
- Hyejung H. Jee, Carlo Sparaciari, Omar Fawzi, **Mario Berta**, *Quasi-polynomial time algorithms for free quantum games in bounded dimension*, International Colloquium on Automata, Languages and Programming, pages 81:1-81:20 (2020).
- Navneeth Ramakrishnan, Raban Iten, Volkher B. Scholz, **Mario Berta**, *Quantum Blahut-Arimoto algorithms*, IEEE International Symposium on Information Theory, pages 1909-1914 (2020), Jack Keil Wolf Student Paper Award.
- Arkin Tikku, Joseph M. Renes, **Mario Berta**, *Additivity in classical-quantum wiretap channels*, IEEE International Symposium on Information Theory, pages 1996-2001 (2020).
- **Mario Berta**, Francesco Borderi, Omar Fawzi, Volkher B. Scholz, *Quantum coding via semidefinite programming*, IEEE International Symposium on Information Theory, pages 260-264 (2019).
- **Mario Berta**, Christoph Hirche, Eneet Kaur, Mark M. Wilde, *Stein's lemma for classical-quantum channels*, IEEE International Symposium on Information Theory, pages 2564-2568 (2019).
- Anurag Anshu, **Mario Berta**, Rahul Jain, Marco Tomamichel, *Second-order characterizations via partial smoothing*, IEEE International Symposium on Information Theory, pages 937-941 (2019).
- Kun Fang, Xin Wang, Marco Tomamichel, **Mario Berta**, *Quantum channel simulation and the channel's smooth max-information*, IEEE International Symposium on Information Theory, pages 2326-2330 (2018).
- **Mario Berta**, Mark M. Wilde, *Strong converse bound on the two-way assisted quantum capacity*, IEEE International Symposium on Information Theory, pages 2167-2171 (2018).
- David Sutter, **Mario Berta**, Marco Tomamichel, *Quantum Markov chains and logarithmic trace inequalities*, IEEE International Symposium on Information Theory, pages 1988-1992 (2017).
- Mark M. Wilde, Marco Tomamichel, **Mario Berta**, *A meta-converse for private communication over quantum channels*, IEEE International Symposium on Information Theory, pages 291-295 (2017).

- **Mario Berta**, Omar Fawzi, Marco Tomamichel, *Exploiting variational formulas for quantum relative entropy*, IEEE International Symposium on Information Theory, pages 2844-2848 (2016).
- **Mario Berta**, Omar Fawzi, Volkher B. Scholz, *Semidefinite programs for randomness extractors*, Conference on Theory of Quantum Computation, Communication, and Cryptography, Leibniz International Proceedings in Informatics 44, pages 73-91 (2015).
- **Mario Berta**, Joseph M. Renes, Mark M. Wilde, *Identifying the information gain of a quantum measurement*, IEEE International Symposium on Information Theory, pages 331-335 (2014).
- Marco Tomamichel, **Mario Berta**, Masahito Hayashi, *A duality relation connecting different quantum generalizations of the conditional Rényi entropy*, IEEE International Symposium on Information Theory, pages 731-735 (2014).
- **Mario Berta**, Omar Fawzi, Volkher B. Scholz, Oleg Szehr, *Variations on classical and quantum extractors*, IEEE International Symposium on Information Theory, pages 1474-1478 (2014).
- **Mario Berta**, Omar Fawzi, Stephanie Wehner, *Quantum to classical randomness extractors*, Advances in Cryptology - CRYPTO, pages 776-793 (2012).
- **Mario Berta**, Fernando Brandão, Matthias Christandl, Stephanie Wehner, *Entanglement cost of quantum channels*, IEEE International Symposium on Information Theory, pages 900-904 (2012).
- **Mario Berta**, Matthias Christandl, Renato Renner, *A Conceptually simple proof of the quantum reverse Shannon theorem*, Conference on Theory of Quantum Computation, Communication, and Cryptography, pages 131-140 (2010).