

Research Publications of Mary Beth Ruskai

1. “N-Representability Problem for an Odd Number of Fermions” *Phys. Rev.* **169**, 101–113 (1968) [with J.E. Harriman].
2. “N-Representability Problem: Conditions on Geminals” *Phys. Rev.* **183**, 129–141 (1969).
3. “N-Representability Problem: Particle-Hole Equivalence” *J. Math. Phys.* **11**, 3218–24 (1970).
4. “Time Development of Quantum Lattice Systems” *Commun. Math. Phys.* **20**, 193–204 (1971).
5. “N-Completeness, N-Representability, & Geminal Expansions” *Phys. Rev.* **A5**, 1336–41 (1972).
6. “Inequalities for Traces on von Neuman Algebras” *Commun. Math. Phys.* **26**, 280–289 (1972).
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8. “Local Products as Operators” *J. Math. Phys.* **14**, 1199–1201 (1973). [with J. Klauder].
9. “A Fundamental Property of the Quantum-Mechanical Entropy” *Phys. Rev. Lett.* **30**, 434–436 (1973) [with E. Lieb].
10. “Proof of the Strong Subadditivity of Quantum Mechanical Entropy” *J. Math. Phys.* **14**, 1938–1941 (1973) [with E. Lieb].
11. “A Generalization of Entropy Using Traces on von Neuman Algebras” *Ann. Inst. H. Poincare A: Physique Theorique* **XIX**, 357–373 (1973).
12. “Some Operator Inequalities of the Schwarz Type” *Adv. Math.* **12**, 269–273 (1974) [with E. Lieb].
13. “Absence of Discrete Spectrum in Highly Negative Ions” *Commun. Math. Phys.* **82**, 457–469 (1982).
14. “Absence of Discrete Spectrum in Highly Negative Ions II. Extension to Fermions” *Commun. Math. Phys.* **85**, 325–327 (1982).
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16. “Density Functional Approach to Quantum Lattice Systems” *J. Stat. Phys.* **38**, 497–518 (1985) [with J. T. Chayes and L. Chayes].
17. “Entropy of Reduced Density Matrices” in *Density Matrices and Density Functionals* ed. by R. Erdahl and V. Smith, pp. 213–230 (Reidel, 1987).
18. “Extremal Properties of Relative Entropy in Quantum Statistical Mechanics” *Reports in Math. Phys.* **26**, 143–150 (1988).
19. “Location of Essential Spectrum of Intermediate Hamiltonians Restricted to Symmetry Subspaces” *J. Math. Phys.* **29**, 2236–2240 (1988) [with C. Beattie].

20. “Limits on Stability of Positive Molecular Ions” *Lett. Math. Phys.* **18**, 121–132 (1989).
21. “Convexity Inequalities for Estimating Free Energy and Relative Entropy” *J. Phys. A: Math. Gen.* **23**, 2421–2437 (1990) [with F. Stillinger].
22. “Limit on the Excess Negative Charge of a Dynamic Diatomic Molecule” *Ann. Inst. H. Poincaré A: Physique Théorique* **52**, 397–414 (1990).
23. “Absence of Bound States in Extremely Asymmetric Positive Diatomic Molecules” *Commun. Math. Phys.* **137**, 553–566 (1991).
24. “Relative Entropy under Mappings by Stochastic Matrices” *Lin. Alg. Appl.* **179**, 211–235 (1992) [with J.E. Cohen, Y. Isawa, G. Rautu, E. Seneta, & G. Zbaganu].
25. “Asymptotic Neutrality of Polyatomic Molecules” in *Schrödinger Operators: The Quantum Mechanical Many-body Problem* (Proceedings of a Workshop at Aarhus, Denmark, May-Aug. 1991) *Lecture Notes in Physics* **403**, ed. by E. Balslev. pp. 153–174 (Springer-Verlag, 1992) [with J.P. Solovej].
26. Introduction to *Wavelets and Their Applications* ed. by M.B. Ruskai, et al, pp. 3–13 (Jones & Bartlett, 1992).
27. “Equivalence of Certain Entropy Contraction Coefficients” *Lin. Alg. Appl.* **208/209**, 29–36 (1994) [with M.D. Choi and E. Seneta].
28. “Beyond Strong Subadditivity? Improved Bounds on the Contraction of Generalized Relative Entropy (with an Appendix on Applications to Logarithmic Sobolev Inequalities)” *Rev. Math. Phys.* **6**, 1147–1161 (1994); reprinted in *The State of Matter* ed. by M. Aizenman and H. Araki, pp. 350-366 (World Scientific, 1994).
29. “Improved Estimates on the Number of Bound States of Negative Bosonic Atoms” *Ann. Inst. H. Poincaré A: Physique Théorique* **61**, 153–162 (1994).
30. “Localization of Outer Electrons in Negative Atoms” in *Differential Equations and Mathematical Physics* (Proceedings of a Conf. at Univ. of Alabama at Birmingham, Mar. 1994), ed. by R. Lewis and I Knowles pp. 187-192 (International Press, 1995).
31. “Contraction of Generalized Relative Entropy under Stochastic Mappings” *Quantum Probability and Infinite Dimensional Analysis* **1**, 83-89 (1998) [with D. Petz].
32. “Relative Entropy and Monotone Riemannian Metrics on Non-Commutative Probability Spaces” *J. Math. Phys.* **40**, 5702–5724 (1999) [with A. Lesniewski].
33. “A One-Dimensional Model for Many-Electron Atoms in Extremely Strong Magnetic Fields: Maximum Negative Ionization” *J. Phys. A: Math. Gen.* **32**, 2567-2582 (1999) [with R. Brummelhuis].

Summaries appeared in “Advances in Differential Equations and Mathematical Physics” *Contemporary Mathematics* **217**, 109-120 (AMS Press, 1998), and *Recent Progress in Many-Body Theories* pp. 110-113 (World Scientific, 1998).

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35. “One Dimensional Regularizations of the Coulomb Potential with Application to atoms in Strong Magnetic Fields” *Differential Equations and Mathematical Physics*, ed. by G. Weinstein and R. Weikard, pp. 43–51 (International Press, 2000) [with R. Brummelhuis and E. Werner]
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37. “Minimal Entropy of States Emerging from Noisy Quantum Channels” *IEEE Trans. Info. Theory* **47**, 192–209 (2001) [with C. King] (quant-ph/9911079).
38. “Capacity of Channels Restricted to Product Measurements” *J. Math. Phys.* **42**, 87–98 (2001) [with C. King] (quant-ph/0004062).
39. “A Characterization of Completely-Positive Trace-Preserving Maps on M_2 ” *Lin. Alg. Appl.* **347**, 159–187 (2002). [with S. Szarek and E. Werner] (quant-ph/0101003)
40. “Qubit Channels Can Require More than Two Inputs to Achieve Capacity” *Phys. Rev. Lett.* **88**, 057901 (2002) [with C. King and M. Nathanson] (quant-ph/0109079).
41. “Comments on Adiabatic Quantum Computation” in *Mathematical Results in Quantum Mechanics* ed by R. Weder, P. Exner, and B. Grébert, *Contemporary Mathematics* **307**, 265–274 (AMS Press, 2002). (quant-ph/0203127)
42. “Inequalities for Quantum Entropy: A Review with Conditions for Equality” *J. Math. Phys.* **43**, 4358–4375 (2002); erratum **46**, 019901 (2005). (quant-ph/0205064).
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47. “Introduction to Quantum Information Theory” invited chapter in *Handbook of Nanotechnology* ed. by A. Lakhtakia, pp. 395–464 (SPIE Press and ASM, 2004).
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49. “Comments on Multiplicativity of p-norms for $p = 2$ ” in *Quantum Information, Statistics and Probability* ed. by O. Hirota, pp. 102–114 (Rinton Press, 2004); reprinted in *Quantum Inf. Comput.* **4**, 500-512 (2004) [with C. King] (quant-ph/0401026).
50. “Qubit Channels Which Require Four Inputs to Achieve Capacity: Implications for Additivity Conjectures” *Quantum Inf. Comput.* **5**, 13–31 (2005).
[with M. Hayashi, H. Imai, K. Matsumoto and T. Shimonono] (quant-ph/0403176).
51. “Lieb's simple proof of concavity of $\text{Tr} A^p K^\dagger B^{(1-p)} K$ and remarks on related inequalities” *Internat. Jour. Quant. Info.* **3**, 570–590 (2005); erratum 4, 747 (2006) (quant-ph/0404126).
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54. “Maximal output purity and capacity for asymmetric unital qudit quantum channels” *J. Phys. A: Math. Gen.* **38**, 9785-9802 (2005). [with N. Datta] (quant-ph/0505048).
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[with C. King , K. Matsumoto and M. Nathanson] (quant-ph/0509126).
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58. “Comment on "Stronger subadditivity of entropy" by Lieb and Seiringer” *Phys.Rev. A* **74**, 026303 (2006) (math-ph/0603022).
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Linden, F. Matús, and A. Winter] (arXiv:1302.5453)
76. “Bounds on the Concavity of Quantum Entropy” **56**, 092201 *J. Math. Phys.* (2014)
[with I. Kim]. (arxiv:1404.5999)
77. “Contraction Coefficients” in preparation [with F. Hiai]
78. “The Gour-Friedland Proof of Local Additivity” draft available [with J. Yard]
79. “Testing 3-state Qubit Channels for Violations of Additivity of Holevo Capacity”,
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