

## Publications

David H. Adams

### Research articles in preparation:

[27] D.H. Adams, *Theoretical foundation for the Index Theorem on the lattice with staggered fermions*. To be submitted to Phys. Rev. Lett.

### Research articles published:

[26] D.H. Adams, *Relation between bare lattice coupling and  $\overline{MS}$  coupling at one loop with general lattice fermions*. Phys. Rev. D 78 (2008) 014512.

[25] D.H. Adams, *The rooting issue for a lattice fermion formulation similar to staggered fermions but without taste mixing*. Phys. Rev. D 77 (2008) 105024.

[24] D.H. Adams and W. Lee, *Structure of logarithmically divergent one-loop lattice Feynman integrals*. Phys. Rev. D 77 (2008) 045010.

[23] D.H. Adams and W. Lee, *Renormalization group evolution for the  $\Delta S = 1$  effective Hamiltonian with  $N_f = 2 + 1$* . Phys. Rev. D 75 (2007) 074502.

[22] D.H. Adams, *On the fourth root prescription for dynamical staggered fermions*. Phys. Rev. D 72 (2005) 114512.

[21] D.H. Adams, *A dimensionally reduced expression for the QCD fermion determinant at finite temperature and chemical potential*. Phys. Rev. D 70 (2004) 045002.

[20] D.H. Adams, *A simplified test of universality in Lattice QCD*. Phys. Rev. Lett. 92 (2004) 162002.

[19] D.H. Adams and W. Bietenholz, *Axial anomaly and index of overlap hypercube operator*. Eur. Phys. J. C 34 (2004) 245–253.

[18] D.H. Adams, *General bounds on the Wilson-Dirac operator*. Phys. Rev. D 68 (2003) 065009.

[17] D.H. Adams and S. Chandrasekharan, *Chiral limit of strongly coupled lattice gauge theories*. Nucl. Phys. B 662 (2003) 220–246.

[16] D.H. Adams, *Gauge fixing, families index theory, and topological features of the space of lattice gauge fields*. Nucl. Phys. B 640 (2002) 435–452.

[15] D.H. Adams, *Families index theory for overlap lattice Dirac operator.I*. Nucl. Phys. B 624 (2002) 469–484.

[14] D.H. Adams, *Axial anomaly and topological charge in lattice gauge theory with overlap Dirac operator*. Ann. Phys. 296 (2002) 131–151.

[13] W. Kamleh, D.H. Adams, D. Leinweber and A. Williams, *Accelerated overlap fermions*. Phys. Rev. D 66:014501 (2002).

[12] D.H. Adams, *On the continuum limit of fermionic topological charge in lattice gauge theory*. J. Math. Phys. 42 (2001) 5522–5533.

- [11] D.H. Adams, *Index of a family of lattice Dirac operators and its relation to the non-abelian anomaly on the lattice*. Phys. Rev. Lett. 86 (2001) 200–203.
- [10] D.H. Adams, *Global obstructions to gauge-invariance in chiral gauge theory on the lattice*. Nucl. Phys. B 589 (2000) 633–656.
- [9] D.H. Adams and E. Prodanov, *A remark on Schwarz’s topological field theory*. Lett. Math. Phys. 51 (2000) 249–255.
- [8] S. Sen Jr., S. Sen, J. Sexton and D.H. Adams, *A geometric discretization scheme applied to the abelian Chern–Simons theory*. Phys. Rev. E 61 (2000) 3174–3185.
- [7] D.H. Adams, *The semiclassical approximation for the Chern–Simons partition function*. Phys. Lett. B 417 (1998) 53–60.
- [6] D.H. Adams, *A note on the Faddeev–Popov determinant and Chern–Simons perturbation theory*. Lett. Math. Phys. 42 (1997) 205–214.
- [5] D.H. Adams, *A doubled discretization of abelian Chern–Simons theory*. Phys. Rev. Lett. 78 (1997) 4155–4158.
- [4] D.H. Adams and S. Sen, *Phase and scaling properties of determinants arising in topological field theories*. Phys. Lett. B 353 (1995) 495–500.

**Research articles unpublished:<sup>1</sup>**

- [3] D.H. Adams, *R-torsion and linking numbers from simplicial abelian gauge theories*. (1996) <http://arxiv.org/abs/hep-th/9612009>
- [2] D.H. Adams, *Perturbative expansion in gauge theories on compact manifolds*. (1996) <http://arxiv.org/abs/hep-th/9602078>
- [1] D.H. Adams and S. Sen, *Partition function of a quadratic functional and semiclassical approximation for Witten’s 3-manifold invariant*. (1995) <http://arxiv.org/abs/hep-th/9503095>

**Conference proceedings, etc.:**

- [C12] D.H. Adams and W. Lee, *Eradication of singularities in the next-to-leading order RG evolution for the  $\Delta S = 1$  effective Hamiltonian with 3 quark flavors*. in Proceedings of the 25th International Symposium on Lattice Field Theory (Lattice 2007), PoS LAT2007:342 (2007).
- [C11] J. Kim, D.H. Adams and W. Lee, *General properties of logarithmically divergent one-loop lattice Feynman integrals*. in Proceedings of the 25th International Symposium on Lattice Field Theory (Lattice 2007), PoS LAT2007:266 (2007).

---

<sup>1</sup>These articles were left unpublished since I was not fully satisfied with their present form; I moved on to other things before getting around to revising them. The article [3] has received quite a bit of attention and citations from researchers in applied areas such as computational electrodynamics. It tackles the issue of constructing a discrete version of the Hodge star operator which is important in various applied contexts.

- [C10] D.H. Adams, *Testing universality and the fractional power prescription for the staggered fermion determinant*. in Proceedings of the 22nd International Symposium on Lattice Field Theory (Lattice 2004), Nucl. Phys. Proc. Suppl. 140 (2005) 148–154.
- [C9] D.H. Adams, *Improving the locality of the overlap Dirac operator via approximate solutions of the Ginsparg–Wilson relation*. in Proceedings of the 21st International Symposium on Lattice Field Theory (Lattice 2003), Nucl. Phys. Proc. Suppl. 129 (2004) 513–515.
- [C8] D.H. Adams, *Fermionic topological charge of families of lattice gauge fields*. in Proceedings of 20th International Symposium on Lattice Field Theory (Lattice 2002), Nucl. Phys. Proc. Suppl. 119 (2003) 775–777.
- [C7] D.H. Adams, *Families index theory, gauge fixing, and topology of the space of lattice gauge fields: a summary*. in Proceedings of the Workshop on Lattice Hadron Physics (LHP 2001), Cairns 2001 (A. Kalloniatis, D. Leinweber, W. Melnitchouk and A. Williams, eds); Nucl. Phys. Proc. Suppl. 109A (2002) 77–80.
- [C6] W. Kamleh, D.H. Adams, D. Leinweber and A. Williams, *Improving the low-lying spectrum of the overlap kernel*. in Proceedings of LHP 2001 (*ibid*), Nucl. Phys. Proc. Suppl. 109A (2002) 81–85.
- [C5] D.H. Adams, *Semiclassical approximation in Chern–Simons gauge theory*. in “Geometric analysis and applications to quantum field theory” (P. Bouwknegt and S. Wu, eds); Progress in Mathematics vol. 205, Birkhäuser, 2002, pp.1–20.
- [C4] D.H. Adams, *Dirac operator index and the topology of lattice gauge fields*. in Proceedings of the Workshop on Chiral Gauge Theory (Chiral ’99), Taipei 1999 (T.-W. Chiu, ed). Chin. J. Phys. 38 (2000) 633–646.
- [C3] D.H. Adams, *Introduction to Chern–Simons gauge theory on general 3-manifolds*. Invited contribution to Proceedings of the 1999 Londrina Winter School “Mathematical Methods in Physics” (A. Bytsenko and F. Williams, eds); World Scientific, 2000, pp.1–43
- [C2] D.H. Adams, *Geometric discretizations of antisymmetric tensor field theories*. in Proceedings of the Workshop on Methods of Nonperturbative QFT, Adelaide 1998 (A. Schreiber, A. Williams, A. Thomas, eds); World Scientific, 1998, pp.202–211.
- [C1] D.H. Adams, S. Sen, S. Sen and J. Sexton, *A lattice calculation of the R-torsion for  $U(1)$  Chern–Simons theory* in Proceedings of the International Symposium on Lattice Field theory (Lattice 1997). Nucl. Phys. Proc. Suppl. 63 (1998) 492–494.