

Workshop on Computational Complexity and High Energy Physics

The workshop will be held on campus at U. Maryland, College Park. All talks will take place in 6137 McKeldin Library. The poster session will take place at QuICS, on the 3rd floor of the Atlantic building. Note: Older maps refer to this as the Computer and Space Sciences (CSS) building.

Monday, July 31:

9-9:30	registration/welcome
9:30-10:15	Andrew Childs: <i>Simulating quantum mechanics with quantum computers</i>
10:15-11:00	John Preskill: <i>Quantum algorithms for simulating quantum field theories</i>
11:00-11:30	break
11:30-12:15	Benni Reznik: <i>Simulating Abelian and non-Abelian lattice gauge theories with cold atoms</i>
12:15-2:00	lunch
2:00-2:45	Daniel Harlow: <i>Black holes, entropy, and holographic encoding</i>
2:45-3:30	Scott Aaronson: <i>Computability theory of closed timelike curves</i>
3:30-4:00	break
4:00-5:15	panel discussion: Scott Aaronson, Ning Bao, Andrew Childs, Daniel Harlow, John Preskill, Benni Reznik, and Brian Swingle (moderated by S. Jordan)

Tuesday, August 1:

9:30-10:15	Michael R. Douglas: <i>Computational complexity of cosmology in string theory</i>
10:15-11:00	Brad Lackey: <i>Optimization algorithms and the cosmological constant</i>
11:00-11:30	break
11:30-12:15	Jacob Taylor: <i>Entanglement-based tests of quantum systems</i>
12:15-2:00	lunch
2:00-2:45	Jutho Haegeman: <i>Free fermion entanglement renormalization and wavelets</i>
2:45-3:30	Ning Bao: <i>Applications of the Holevo information to holography</i>
3:30-5:30	poster session

Wednesday, August 2:

9:30-10:15	Stephen Jordan: <i>BQP-completeness of scattering in quantum field theory</i>
10:15-11:00	Martin Savage: <i>Quantum chromodynamics in the exascale era with the emergence of quantum computing</i>
11:00-11:30	break
11:30-12:15	Brian Swingle: <i>Complexity, quantum field theory, and black holes</i>
12:15	closing remarks

Poster Session (3:30-5:30, Tuesday, August 1 at QuICS)

Aniruddha Bapat: Bang-bang control of classical and quantum optimization algorithms

Su-Kuan Chu: Scale invariant entanglement renormalization of Chern insulator

Abhinav Deshpande: Complexity of sampling as an order parameter

Zachary Eldredge: Long range interactions accelerate state transfer and MERA circuits

Honghao Fu: Certified randomness is both local and global

Siddhartha Harmalkar: Using restricted Boltzmann machines to accelerate Monte Carlo simulations

Shih-Han Hung: Quantum algorithm for multivariate interpolation

Katharine Hyatt: Extracting entanglement geometry from quantum states

Amir Kalev: Rigidity of the magic pentagram game

Scott Lawrence: Solving an exponential sign problem with deep learning?

Aaron Ostrander: Quantum algorithm for linear differential equations with exponentially improved dependence on precision

Gregory Ridgway: Real time dynamics on the lattice

Troy Sewell: Quantum field theory via semidefinite programming

Yuan Su: Commutator bounds for product formulas

Neill Warrington: Controlling the sign problem with complex geometry

Guanyu Zhu: Modular transformations and manifold surgery on topological codes and matter