

Session Program

26-30 Jul 2021



**The 38th International Symposium on Lattice
Field Theory**

***Algorithms (including Machine Learning,
Quantum Computing, Tensor Networks)***

Monday 26 July

13:00

Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

Session | Convener: Zohreh Davoudi

13:00-13:15 **From tensors to qubits**

Speaker

Yannick Meurice

13:15-13:30 **Open Lattice Field Theory**

Speaker

Jay Hubisz

13:30-13:45 **Quantum Algorithms for Open Lattice Field Theories**

Speaker

Bharath Sambasivam

13:45-14:00 **Simulation of Open LFT**

Speaker

Michael Hite

14:00-14:15

Toward Quantum Simulations using Discrete Subgroup Approximations

Speaker

Hank Lamm

14:15-14:30 **Quantum Algorithms for Simulating the Lattice Schwinger Model**

Speaker

Alexander Shaw

14:30-14:45

Subleading conformal dimensions using a qubit regularization of the $O(4)$ model

Speaker

Prof. Shailesh Chandrasekharan

14:45-15:00 **Qubit Regularization of Asymptotic Freedom**

Speaker

Hersh Singh

15:00

21:00

Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

Session | Convener: Arata Yamamoto

21:00-21:15

Toward Simulations of Scalar Quantum Electrodynamics on Quantum Computers

Speaker

Erik Gustafson

21:15-21:30

3+1D Topological θ -Term in the Hamiltonian Formulation of Lattice Gauge Theories for Quantum and Classical Simulations**Speaker**

Angus Kan

21:30-21:45

Fuzzy sphere regularization of the 1+1 dimensional sigma model**Speaker**

Andrea Carosso

21:45-22:00

Hybrid analog-digital quantum simulations for quantum field theories**Speaker**

Prof. Zohreh Davoudi

22:00-22:15

Real-time Quantum Calculations of Phase Shifts On NISQ Hardware Platforms Using Wavepacket Time Delay**Speaker**

Patrick Dreher

22:15-22:30

Quantum simulation of quantum mechanics with a theta-term for a 't Hooft anomaly**Speaker**

Jiayu Shen

22:30-22:45

Accessing scattering amplitudes using quantum computers**Speaker**

Juan Guerrero

22:45-23:00

Quantum algorithm for simulation of an SU(2) lattice gauge theory with fermions**Speaker**

Jesse Stryker

23:00

Tuesday 27 July

13:00

Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

Session | Convener: Xiao-Yong Jin

13:00-13:15 **Smearing is a neural network**

Speaker

Akio Tomiya

13:15-13:30 **Contour Deformations for Lattice Field Theory**

Speaker

Neill Warrington

13:30-13:45

Observifolds: Taming the observable signal-to-noise problem via path integral contour deformations

Speaker

Gurtej Kanwar

13:45-14:00

From lattice QCD to heavy-flavor in-medium potential via deep learning

Speaker

Dr Shuzhe SHI

14:00-14:15

Bayesian Model Averaging for Lattice Field Theory

Speaker

Prof. Ethan Neil

14:15-14:30

Real Time Dynamics At Large N

Speaker

Scott Lawrence

14:30-14:45

Tensor renormalization group analysis for reduced staggered fermions

Speaker

Ryo Sakai

14:45-15:00

Tensor network simulations at nonzero chemical potential and temperature

Speakers

Jacques Bloch, Jacques Bloch

15:00

Wednesday 28 July

13:00

Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

Session | Convener: Yannick Meurice

13:00-13:15 Bayesian Optimization for Variational Quantum Eigensolvers

Speaker

Giovanni Iannelli

13:15-13:30 Quantum computing for lattice supersymmetry

Speaker

Chris Culver

13:30-13:45 Dimensional Expressivity Analysis for Parametric Quantum Circuits

Speaker

Tobias Hartung

13:45-14:00

Improving Schrodinger Equation Implementations with Gray Code for Adiabatic Quantum Computers

Speaker

Chia Cheng Chang

14:00-14:15 Effects of Cosine Tapering Window on Quantum Phase Estimation

Speaker

Gumaro Rendón

14:15-14:30

Gauge field compression in SU(N) theories and spatial correlations on the lattice

Speaker

Dean Howarth

14:30-14:45

Solving DWF Dirac Equation Using Multi-splitting Preconditioned Conjugate Gradient with Tensor Cores on NVIDIA GPUs

Speaker

Jiqun Tu

14:45-15:00 State of the art multi-grid algorithms in QUDA

Speaker

Dr Evan Weinberg

15:00

21:00

Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

Session | Convener: Masafumi Fukuma

21:00-21:15 Toward dense QCD in quantum computers

Speaker

Arata Yamamoto

21:15-21:30

Model Independent Error Mitigation in Parametric Quantum Circuits and Depolarizability of Quantum Noise**Speaker**

Xiaoyang Wang

21:30-21:45

Propagator generation with Chroma+QUDA for various fermion actions**Speaker**

Kuan Zhang

21:45-22:00

A new technique for solving the freezing problem in the complex Langevin simulation of 4D SU(2) gauge theory with a theta term**Speaker**

Mr Akira Matsumoto

22:00-22:15

Machine learning Hadron Spectral Functions in Lattice QCD**Speaker**

Chen ShiYang

22:15-22:30

A universal neural network for learning phases and criticalities**Speaker**

Prof. Fu-Jiun Jiang

22:30-22:45

A novel method to evaluate real-time path integral for scalar ϕ^4 theory**Speaker**

Dr SHINJI TAKEDA

22:45-23:00

Novel Algorithms for Computing Correlation Functions of Large Nuclei**Speaker**

Nabil Humphrey

23:00

Thursday 29 July

05:00

Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

Session | Conveners: Lukas Kades, Chris Culver

05:00–05:15

Machine learning with quantum field theories

Speaker

Dimitrios Bachtis

05:15–05:30

Lattice Gauge Symmetry in Neural Networks

Speaker

Dr David Mueller

05:30–05:45

Generalization capabilities of neural networks in lattice applications

Speaker

Matteo Favoni

05:45–06:00

Interpreting machine learning functions as physical observables

Speakers

Gert Aarts,

06:00–06:15

Machine Learning for Thermodynamic Observables

Speaker

Kim Nicoli

06:15–06:30

Machine learning phase transitions in a scalable manner

Speaker

Marina Krstic Marinkovic

06:30–06:45

Simulating Complex Langevin at short real-times with stable implicit solvers

Speaker

Daniel Alvestad

06:45–07:00

The basics and applications of the tempered Lefschetz thimble method for the numerical sign problem

Speaker

Masafumi Fukuma

07:00–07:15

CP-violating Dashen phase transition in the two-flavor Schwinger model: a study with matrix product states

Speaker

Stefan Kühn

07:15–07:30

A variance reduction technique for hadronic correlators with partially twisted boundary conditions

08:00

13:00

15:00

| |
|---|
| <p>Speaker Alessandro Barone</p> |
| <p>07:30-07:45 Using classical bit-flip correction for error mitigation in quantum computations Speaker Dr Karl Jansen</p> |
| <p>07:45-08:00 Benchmarking the performance of readout error mitigation through classical bit-flip correction on IBM and Rigetti devices Speaker Georgios Polykratis</p> |
| <p>Algorithms (including Machine Learning, Quantum Computing, Tensor Networks) Session Convener: Taku Izubuchi</p> |
| <p>13:00-13:15 Comparison of topology changing update algorithms Speaker Mr Timo Eichhorn</p> |
| <p>13:15-13:30 Improved topological sampling for lattice gauge theories Speaker David Albandea Jordán</p> |
| <p>13:30-13:45 Flow-based sampling for fermionic field theories Speaker Michael Albergo</p> |
| <p>13:45-14:00 Neural Network Field Transformation and Its Application in HMC Speaker Xiao-Yong Jin</p> |
| <p>14:00-14:15 Sampling lattice gauge theory in four dimensions with normalizing flows Speaker Denis Boyda</p> |
| <p>14:15-14:30 Riemannian Manifold Hybrid Monte Carlo in Lattice QCD Speaker Tuan Nguyen</p> |
| <p>14:30-14:45 Gauge-Fixed Fourier Acceleration Speaker Ahmed Sheta</p> |
| <p>14:45-15:00 LeapFrogLayers: A Trainable Framework for Effective Topological Sampling Speaker Sam Foreman</p> |

21:00

Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

Session | Convener: Fu-Jiun Jiang

21:00-21:15

The truncated $U(1)$ Abelian Higgs model and implications for its quantum simulation

Speaker

Jin Zhang

21:15-21:30

Tensor network simulations of a manifestly gauge-invariant $SU(2)$ lattice gauge theory formulation

Speaker

Aniruddha Bapat

21:30-21:45

Truncation effects in dual representations of the $O(2)$ model

Speaker

Shan-Wen Tsai

21:45-22:00

Clock model interpolation and symmetry breaking in $O(2)$ models

Speaker

Leon Hostetler

22:00-22:15

Lie group integrators and efficient integration of gradient flow

Speaker

Oleksiy Bazavov

22:15-22:30

Prediction and compression of lattice QCD data using machine learning algorithms on quantum annealer

Speaker

Dr Boram Yoon

22:30-22:45

Investigating a Renormalization Group Multigrid Approach for Domain Wall Fermions

Speaker

Robert Mawhinney

22:45-23:00

Algorithms for domain wall Fermions

Speaker

Peter Boyle

23:00

Friday 30 July

05:00

Algorithms (including Machine Learning, Quantum Computing, Tensor Networks)

Session | Conveners: Karl Jansen, Gert Aarts

05:00–05:15 The Hubbard model with fermionic Tensor Networks

Speaker

Manuel Schneider

05:15–05:30 Tensor network simulation of strongly coupled $U(N)$

Speaker

Pascal Milde

05:30–05:45

Tensor renormalization group calculation for the phase structure of the $CP(1)$ model in the presence of a topological term

Speaker

Katsumasa Nakayama

05:45–06:00 Towards sampling complex actions

Speaker

Lukas Kades

06:00–06:15

A numerical and theoretical study of multilevel performance for two-point correlator calculations

Speaker

Ben Kitching-Morley

06:15–06:30

Calculation of the running coupling in non-Abelian gauge theories from Jarzynski's equality

Speaker

Marco Panero

06:45–07:00 Implementing noise reduction techniques into the OpenQxD package

Speaker

Lucius Bushnaq

07:00–07:15 Performance optimizations for porting the openQ*D package to GPUs

Speaker

Roman Gruber

07:15–07:30

Twisted mass gauge ensembles at physical values of the light, strange and charm quark masses

Speaker

Jacob Finkenrath

07:30-07:45

Coarsest-Level Improvements of Multigrid for Lattice QCD on Large-Scale Computers

Speaker

Gustavo Ramirez-Hidalgo

07:45-08:00

Implementation of Simultaneous Inversion of a Multi-shifted Dirac Matrix for Twisted-Mass Fermions within DD α AMG

Speaker

Shuhei Yamamoto

08:00