

Hamiltonian Lattice Gauge Theories: Status, Novel Developments and Applications

Report of Contributions

Contribution ID: 1

Type: **not specified**

Welcome by the ECT* Director

Monday 1 September 2025 09:00 (30 minutes)

Contribution ID: 2

Type: **not specified**

Overview by the Organisers

Monday 1 September 2025 09:30 (30 minutes)

Presenters: URBACH, Carsten (University of Bonn); ORTEGA, Enrique (University of the Basque Country UPV/EHU); MAGNIFICO, Giuseppe (University of Bari); Dr ROMITI, Simone (Uni-Bern)

Contribution ID: 3

Type: **not specified**

Quantum Simluation of Fundamental Physics

Monday 1 September 2025 10:00 (1 hour)

Presenter: SAVAGE, Martin (INT & University of Washington)

Contribution ID: 4

Type: **not specified**

Symmetry verification for noisy quantum simulations of non-Abelian lattice gauge theories

Monday 1 September 2025 11:30 (30 minutes)

Presenter: BALLINI, Edoardo (Università di Trento)

Contribution ID: 5

Type: **not specified**

Large N Truncation of SU(N) Lattice Gauge Theory

Monday 1 September 2025 12:00 (30 minutes)

Presenter: CIAVARELLA, Anthony (Lawrence Berkeley National Lab)

Contribution ID: 6

Type: **not specified**

Composite particle spectroscopy in the Hamiltonian approach

Monday 1 September 2025 14:00 (30 minutes)

Presenter: ITOU, Etsuko (RIKEN)

Contribution ID: 7

Type: **not specified**

Digitised Hamiltonian SU(2) Lattice Gauge Theories at Weak Couplings

Monday 1 September 2025 14:30 (30 minutes)

Presenter: JAKOBS, Timo

Contribution ID: 8

Type: **not specified**

Strongly Coupled QCD on a Quantum Annealer

Monday 1 September 2025 15:30 (30 minutes)

Presenter: LUU, Thomas (IAS-4, Forschungszentrum Jülich)

Contribution ID: 9

Type: **not specified**

Loop-String Formulation of SU(3) (t.b.c)

Monday 1 September 2025 16:00 (30 minutes)

Presenter: Dr STRYKER, Jesse (Lawrence Berkeley National Laboratory)

Contribution ID: **10**

Type: **not specified**

Discussion

Monday 1 September 2025 16:30 (1 hour)

Presenters: URBACH, Carsten (University of Bonn); ORTEGA, Enrique (University of the Basque Country UPV/EHU); MAGNIFICO, Giuseppe (University of Bari); Dr ROMITI, Simone (Uni-Bern)

Contribution ID: **11**

Type: **not specified**

Quantum Computing and Applications for Lattice Gauge Theories

Tuesday 2 September 2025 09:00 (1 hour)

Presenter: BAUER, Christian (LBNL)

Contribution ID: 12

Type: **not specified**

Selected topics in tensor networks

Wednesday 3 September 2025 09:00 (1 hour)

Presenter: KÜHN, Stefan (DESY, CQTA)

Contribution ID: 13

Type: **not specified**

Matching Lagrangian and Hamiltonian Simulations in (2+1)-dimensional U(1) Gauge Theory

Tuesday 2 September 2025 10:00 (30 minutes)

Presenter: GROSS, Christiane Franziska (HISKP, Uni Bonn)

Contribution ID: 14

Type: **not specified**

String Breaking and Glueball Formation in 2+1D Lattice Gauge Theories

Wednesday 3 September 2025 10:00 (30 minutes)

Presenter: HALIMEH, Jad (Ludwig Maximilian University of Munich)

Contribution ID: 15

Type: **not specified**

Universal Protocol for Quantum Simulation of Gauge Theories in Arbitrary Dimensions and Gauge Groups

Tuesday 2 September 2025 11:00 (30 minutes)

Presenter: HANADA, Masanori (Queen Mary University of London)

Contribution ID: 16

Type: **not specified**

Simulating SU(2) Yang-Mills Theory with near-term VQE methods

Tuesday 2 September 2025 11:30 (30 minutes)

Presenter: LIEGENER, Klaus (Walther-Meißner Institute / Technical University of Munich)

Contribution ID: 17

Type: **not specified**

A Quantum Link Model with Heavy Hex Topology

Tuesday 2 September 2025 14:00 (30 minutes)

Presenter: WIESE, Uwe-Jens (University of Bern, Switzerland)

Contribution ID: **18**

Type: **not specified**

Critical behavior of the Schwinger model via gauge-invariant variational uniform matrix product states

Wednesday 3 September 2025 11:00 (30 minutes)

Presenter: OKUDA, Takuya (University of Tokyo)

Contribution ID: **19**

Type: **not specified**

Duality and entanglement in lattice gauge theories (t.b.c)

Tuesday 2 September 2025 14:30 (30 minutes)

Presenter: BULGARELLI, Andrea (University of Turin and INFN Turin)

Contribution ID: 20

Type: **not specified**

Nonperturbative signatures of fractons in the twisted multi-flavor Schwinger model

Wednesday 3 September 2025 11:30 (30 minutes)

Presenter: POPOV, Pavel (ICFO)

Contribution ID: 21

Type: **not specified**

Static Quark Potential in a $SU(2)$ Quantum Link Model (t.b.c)

Wednesday 3 September 2025 12:00 (30 minutes)

Presenter: LUDWIG, Paul (University of Bonn)

Contribution ID: 22

Type: **not specified**

Neural quantum states for SU(2) lattice gauge theory

Wednesday 3 September 2025 14:00 (30 minutes)

Presenter: SPRIGGS, Thomas (TU Delft, QuTech)

Contribution ID: 23

Type: **not specified**

Non-abelian (1+1)d gauge theories using infinite matrix product states

Wednesday 3 September 2025 14:30 (30 minutes)

Presenter: SØGAARD, Benjamin (Princeton)

Contribution ID: 24

Type: **not specified**

TBA Johann Ostmeyer / Marko Malezic ‘improved time evolution’

Wednesday 3 September 2025 15:30 (30 minutes)

Contribution ID: 25

Type: **not specified**

Discussion session

Wednesday 3 September 2025 16:00 (1 hour)

Contribution ID: 26

Type: **not specified**

Smart quantum simulations: relaxing requirements using quantum-inspired, classical algorithms

Tuesday 2 September 2025 15:00 (30 minutes)

Presenter: DELLANTONIO, Luca (Exeter University)

Contribution ID: 27

Type: **not specified**

Convergence and Efficiency of Quantum Imaginary Time Evolution

Tuesday 2 September 2025 15:30 (30 minutes)

Presenter: HARTUNG, Tobias

Contribution ID: 28

Type: **not specified**

Poster Session

Tuesday 2 September 2025 16:00 (1h 30m)

Presenters: NEGRO, Alessio (University of Bonn, HISKP); RAVA, Andrea Basilio; MEINECKE, Florian (Universität Bonn, Institut für Numerische Simulation); PEDERIVA, Giovanni; ZHANG, Jinglei (University of Waterloo); GISTI, Martina (Università di Bonn); LUU, Thomas (IAS-4, Forschungszentrum Jülich)

Contribution ID: 29

Type: **not specified**

The QCCD trapped-ion architecture and its benefits for Lattice Gauge Theories

Thursday 4 September 2025 09:00 (1 hour)

Presenter: RINALDI, Enrico (Quantinuum Ltd.)

Contribution ID: 30

Type: **not specified**

Renormalized dual basis for scalable simulations of (2+1)D compact quantum electrodynamics

Thursday 4 September 2025 10:00 (30 minutes)

Presenter: MIRANDA-RIAZA, Marc (Universitat Autònoma de Barcelona)

Contribution ID: **31**

Type: **not specified**

How many states are gauge-invariant?

Thursday 4 September 2025 11:00 (30 minutes)

Presenters: MARIANI, Alessandro (University of Bern); MARIANI, Alessandro

Contribution ID: 32

Type: **not specified**

Spontaneously Broken Non-Invertible Symmetries in Transverse-Field Ising Qudit Chains

Thursday 4 September 2025 11:30 (30 minutes)

Presenter: MOROZ, Sergej (Karlstad University)

Contribution ID: 33

Type: **not specified**

Summary of the organizers

Friday 5 September 2025 09:00 (1 hour)

Presenters: URBACH, Carsten (University of Bonn); ORTEGA, Enrique (University of the Basque Country UPV/EHU); MAGNIFICO, Giuseppe (University of Bari); JANSEN, Karl (DESY Zeuthen / CQTA); LEWIS, Randy (York University); Dr ROMITI, Simone (Uni-Bern)

Contribution ID: **34**

Type: **not specified**

Concluding discussion

Friday 5 September 2025 10:30 (1h 30m)