

DTP-TALENT 2025 | Quantum Computing for Nuclear Physics

Report of Contributions

Contribution ID: 1

Type: **not specified**

Basic elements of quantum computing and brief review of relevant quantum mechanical properties

Monday 16 June 2025 09:15 (45 minutes)

Presenter: HJORTH-JENSEN, Morten (Michigan State University (USA))

Contribution ID: 2

Type: **not specified**

Qubits, density matrices, and entanglement.

Monday 16 June 2025 10:15 (45 minutes)

Presenter: HJORTH-JENSEN, Morten (Michigan State University (USA))

Contribution ID: 3

Type: **not specified**

Quantum gates and quantum circuits

Monday 16 June 2025 11:30 (45 minutes)

Presenter: HJORTH-JENSEN, Morten (Michigan State University (USA))

Contribution ID: 4

Type: **not specified**

Repetition from Monday and start discussion of quantum simulations

Tuesday 17 June 2025 09:15 (45 minutes)

Presenter: HJORTH-JENSEN, Morten (Michigan State University (USA))

Contribution ID: 5

Type: **not specified**

Measuring observables (direct, Hadamard test), non unitary gates

Tuesday 17 June 2025 10:15 (45 minutes)

Presenter: ROGGERO, Alessandro

Contribution ID: 6

Type: **not specified**

Methods for Hamiltonian dynamics

Tuesday 17 June 2025 11:30 (45 minutes)

Presenter: ROGGERO, Alessandro

Contribution ID: 7

Type: **not specified**

Seminar: Quantum Computing at NVIDIA and Integrating Quantum Computing with HPC

Tuesday 17 June 2025 15:30 (1h 30m)

Presenter: LIETZ, Justin (NVIDIA)

Contribution ID: 8

Type: **not specified**

Hamiltonian formulation of lattice gauge theories I

Wednesday 18 June 2025 09:15 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: 9

Type: **not specified**

Hamiltonian formulation of lattice gauge theories II

Wednesday 18 June 2025 10:15 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: **10**

Type: **not specified**

Hamiltonian formulation of lattice gauge theories III

Wednesday 18 June 2025 11:30 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: 11

Type: **not specified**

Quantum-simulation basics I

Thursday 19 June 2025 09:15 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: **12**

Type: **not specified**

Quantum-simulation basics II

Thursday 19 June 2025 10:15 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: **13**

Type: **not specified**

Quantum-simulation basics III

Thursday 19 June 2025 11:30 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: 14

Type: **not specified**

Quantum computation of lattice gauge theories I

Friday 20 June 2025 09:15 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: 15

Type: **not specified**

Quantum computation of lattice gauge theories II

Friday 20 June 2025 10:15 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: **16**

Type: **not specified**

Quantum computation of lattice gauge theories III

Friday 20 June 2025 11:30 (45 minutes)

Presenter: DAVOUDI, Zohreh (Department of Physics, University of Maryland)

Contribution ID: 17

Type: **not specified**

Introducing realistic nuclear physics Hamiltonians, the Lipkin model

Monday 23 June 2025 09:15 (45 minutes)

Presenter: HJORTH-JENSEN, Morten (Michigan State University (USA))

Contribution ID: **18**

Type: **not specified**

Variational quantum eigensolver (VQE), part 1

Monday 23 June 2025 10:15 (45 minutes)

Presenters: BAZAVOV, Alexei (Michigan State University, United States); HJORTH-JENSEN, Morten (Michigan State University (USA)); LAROSE, Ryan

Contribution ID: **19**

Type: **not specified**

Variational quantum eigensolver (VQE), part 2

Monday 23 June 2025 11:30 (45 minutes)

Presenters: BAZAVOV, Alexei (Michigan State University, United States); HJORTH-JENSEN, Morten (Michigan State University (USA)); LAROSE, Ryan

Contribution ID: 20

Type: **not specified**

Nuclear Hamiltonians and the VQE

Tuesday 24 June 2025 09:15 (45 minutes)

Presenter: HJORTH-JENSEN, Morten (Michigan State University (USA))

Contribution ID: 21

Type: **not specified**

Noise mitigation and NISQ computing 1

Tuesday 24 June 2025 10:15 (45 minutes)

Presenter: LAROSE, Ryan

Contribution ID: 22

Type: **not specified**

Noise mitigation and NISQ computing 2

Tuesday 24 June 2025 11:30 (45 minutes)

Presenter: LAROSE, Ryan

Contribution ID: 23

Type: **not specified**

Quantum Fourier Transforms (QFTs)

Wednesday 25 June 2025 09:15 (45 minutes)

Presenters: BAZAVOV, Alexei (Michigan State University, United States); LAROSE, Ryan

Contribution ID: 24

Type: **not specified**

Quantum Fourier Transforms and circuits for QFTs

Wednesday 25 June 2025 10:15 (45 minutes)

Presenters: BAZAVOV, Alexei (Michigan State University, United States); LAROSE, Ryan

Contribution ID: 25

Type: **not specified**

QFTs and Quantum Phase Estimation (QPE) algorithm

Wednesday 25 June 2025 11:30 (45 minutes)

Presenters: BAZAVOV, Alexei (Michigan State University, United States); LAROSE, Ryan

Contribution ID: 26

Type: **not specified**

How to implement the QPE algorithm and simple eigenvalue problems

Friday 27 June 2025 09:15 (45 minutes)

Presenter: BAZAVOV, Alexei (Michigan State University, United States)

Contribution ID: 27

Type: **not specified**

Simple eigenvalue problems and the QPE

Friday 27 June 2025 10:15 (45 minutes)

Presenter: BAZAVOV, Alexei (Michigan State University, United States)

Contribution ID: **28**

Type: **not specified**

Nuclear response functions

Friday 27 June 2025 11:30 (45 minutes)

Presenter: ROGGERO, Alessandro

Contribution ID: 29

Type: **not specified**

Rodeo algorithm for nuclear eigenvalue problems, part 1

Monday 30 June 2025 09:15 (45 minutes)

Presenter: LEE, Dean (Michigan State University)

Contribution ID: **30**

Type: **not specified**

Rodeo algorithm for nuclear eigenvalue problems, part 2

Monday 30 June 2025 10:15 (45 minutes)

Presenter: LEE, Dean (Michigan State University)

Contribution ID: 31

Type: **not specified**

Implementing the Rodeo algorithm

Monday 30 June 2025 11:30 (45 minutes)

Presenter: LEE, Dean (Michigan State University)

Contribution ID: 32

Type: **not specified**

Quantum error correction and fault tolerance, part 1

Tuesday 1 July 2025 09:15 (45 minutes)

Presenters: ROGGERO, Alessandro; LEE, Dean (Michigan State University)

Contribution ID: 33

Type: **not specified**

Quantum error correction and fault tolerance, part 2

Tuesday 1 July 2025 10:15 (45 minutes)

Presenters: ROGGERO, Alessandro; LEE, Dean (Michigan State University)

Contribution ID: **34**

Type: **not specified**

Grover/amplitude amplification/estimation

Tuesday 1 July 2025 11:30 (45 minutes)

Presenter: LEE, Dean (Michigan State University)

Contribution ID: 35

Type: **not specified**

Modern techniques (LCU,QSP,QDRIFT), part 1

Wednesday 2 July 2025 09:15 (45 minutes)

Presenter: ROGGERO, Alessandro

Contribution ID: 36

Type: **not specified**

Modern techniques (LCU,QSP), part 2

Wednesday 2 July 2025 10:15 (45 minutes)

Presenter: ROGGERO, Alessandro

Contribution ID: 37

Type: **not specified**

Randomized quantum algorithms

Wednesday 2 July 2025 11:30 (45 minutes)

Presenter: ROGGERO, Alessandro

Contribution ID: 38

Type: **not specified**

Encoding (relativistic and nonrelativistic) fermions and bosons on quantum computers, part 1

Thursday 3 July 2025 09:15 (45 minutes)

Presenter: LEE, Dean (Michigan State University)

Contribution ID: 39

Type: **not specified**

Encoding (relativistic and nonrelativistic) fermions and bosons on quantum computers, part 2

Thursday 3 July 2025 10:15 (45 minutes)

Presenter: LEE, Dean (Michigan State University)

Contribution ID: 40

Type: **not specified**

Adiabatic state preparation

Thursday 3 July 2025 11:30 (45 minutes)

Presenter: LEE, Dean (Michigan State University)