

FRIB-TA Summer School: Quantum Computing and Nuclear Few- and Many-Body Problems



Theory Alliance
FACILITY FOR RARE ISOTOPE BEAMS

Monday 20 June 2022 - Wednesday 22 June 2022

Facility for Rare Isotope Beams

Scientific Programme

Detailed lecture plan

Lectures are 50 minutes and there is a small break of 10 minutes between each lecture. Longer breaks at 1030am-11am and 3pm-330pm. In-person attendance is the main teaching modus.

Teachers (teaching team will be updated)

AB = Alexei Bazavov

BH = Benjamin Hall

DL = Dean Lee

JW = Jacob Watkins

MHJ = Morten Hjorth-Jensen

RL = Ryan Larose

Monday June 20 (Teachers AB, BH, DL, JW, MHJ, and RL)

8am-830am: Welcome and registration

830am-930am: Introduction to quantum computing, qubits and systems of qubits

930am-1030am: Measurements, Superposition and Entanglement

1030am-11am: Break, coffee, tea etc

11am-12pm: Gates, unitary transformations and quantum circuits

12pm-1pm: Lunch

1pm-2pm: Preparing for hands-on session, Quantum algorithms and implementation on a real quantum computer, part I

2pm-3pm: Quantum algorithms and implementation on a real quantum computer, part II

3pm-330pm: Break, coffee, tea etc

330pm-6pm: hands-on sessions and problem solving

Tuesday June 21 (Teachers AB, BH, DL, JW, MHJ, and RL)

830am-930am: Quantum algorithms for quantum mechanical systems

930am-1030am: Quantum simulation of the Schroedinger equation

1030am-11am: Break, coffee, tea etc

11am-12pm: Quantum computing and nuclear few- and many-body systems

12pm-1pm: Lunch

1pm-2pm: Preparing for hands-on session, Quantum state preparation and Quantum simulations

2pm-3pm: Quantum simulations on a real quantum computer

3pm-330pm: Break, coffee, tea etc

330pm-6pm: hands-on sessions and problem solving and tour of FRIB

Wednesday June 22 (Teachers AB, BH, DL, JW, MHJ, and RL)

830am-930am: Quantum Field theory and quantum computing, part I

930am-1030am: Quantum Field theory and quantum computing, part II

1030am-11am: Break, coffee, tea etc

11am-12pm: Quantum error corrections, part I

12pm-1pm: Lunch

1pm-2pm: Quantum error corrections, part II

2pm-3pm: Implementations on real quantum computers

3pm-330pm: Break, coffee, tea etc

330pm-6pm: hands-on sessions and problem solving