

**202206 FRIB Theory Alliance Summer School:
Quantum Computing and Few- and Many-Body Problems
Facility for Rare Isotope Beams (FRIB)
20 - 22 June, 2022**

AGENDA

Monday, 20 June, 2022 - 1200 FRIB Laboratory

Start	Duration	Agenda Item	Speaker
		Instructors - Alexei Bazavov (MSU), Benjamin Hall (MSU), Dean Lee (MSU), Jacob Watkins (MSU), Joey Bonitati (MSU), Morten Hjorth-Jensen (MSU), Ryan Larose (MSU) and Zhengrong Qian (MSU)	
8:00 AM	0:30	01 Welcome and registration	
8:30 AM	1:00	02 Introduction to quantum computing, qubits and systems of qubits, gates and quantum circuits	A. Bazavov
9:30 AM	1:00	03 Measurements, Superposition and Entanglement	A. Bazavov
10:30 AM	0:30	04 <i>Break, coffee, tea etc</i>	
11:00 AM	1:00	05 Hands-on session with applications and introduction to software libraries	J. Watkins R. Larose
12:00 PM	1:00	06 <i>Lunch (shorter lunch, else 1h30m lunches)</i>	
1:00 PM	1:00	07 Algorithms for quantum dynamics, simple problems	D. Lee
2:00 PM	1:00	08 Quantum phase estimation and adiabatic evolution, simple problems	J. Bonitati Z. Qian
3:00 PM	1:00	09 <i>Break, coffee, tea etc - or FRIB Tour - 24 people maximum. See sign-up sheet at registration table. Meet outside 1300 Laboratory</i>	Z. Constan
4:00 PM	2:00	10 Hands-on sessions and problem solving	A. Bazavov + All
6:00 PM	0:00	11 Adjourn	

Tuesday, 21 June, 2022 - 1200 FRIB Laboratory

Start	Duration	Agenda Item	Speaker
8:30 AM	1:00	01 Hamiltonian simulation: a general overview	J. Watkins
9:30 AM	1:00	02 Introduction to VQE and simple model	B. Hall
10:30 AM	0:30	03 <i>Break, coffee, tea etc</i>	
11:00 AM	1:00	04 Many-body theory and nuclear few- and many-body systems	B. Hall, M. Hjorth-Jensen
12:00 PM	1:30	05 <i>Lunch</i>	
1:30 PM	1:00	06 Quantum algorithms (VQE) and nuclear physics with applications, part I	B. Hall M. Hjorth-Jensen
2:30 PM	1:00	07 Quantum algorithms (VQE) and nuclear physics with applications, part II	B. Hall M. Hjorth-Jensen
3:30 PM	0:30	08 <i>Break, coffee, tea etc</i>	
4:00 PM	2:00	08 Hands-on sessions and problem solving	B. Hall, J. Watkins + All
6:00 PM	0:00	09 Adjourn	



Wednesday, 22 June, 2022 - 1200 FRIB Laboratory

Start	Duration	Agenda Item	Speaker
8:30 AM	1:00	01 Noise, error correction and mitigation, part I	R. Larose
9:30 AM	1:00	02 Noise, error correction and mitigation, part II	R. Larose
10:30 AM	0:30	03 <i>Break, coffee, tea etc</i>	
11:00 AM	1:00	04 Practicing error correction and mitigation, hands-on part	R. Larose
12:00 PM	1:30	05 <i>Lunch</i>	
1:30 PM	1:00	06 Wrapping up and defining nuclear many-body system to study for hands-on session	All
2:30 PM	1:00	07 Start hands-on session	
3:30 PM	0:30	08 <i>Break, coffee, tea etc</i>	
4:00 PM	2:00	08 Hands-on sessions and problem solving	All
6:00 PM	0:00	09 Adjourn	

