

2021 Boulder Summer School

Ultracold Matter

July 5 – 30, 2021

Detailed schedule

All lectures are given by Zoom
streaming on the [BSS Physics School YouTube Channel](#)

Public lecture is given by Zoom

<https://cuboulder.zoom.us/j/92552351197>

Meeting ID: 925 5235 1197

[View the Lecture on YouTube](#)

Week 1, July 5 – 9

Resonant Bose and Fermi atomic and molecular gases in traps and lattices
all times are in MST

Monday, July 5th

8:30 – 9:00

Leo Radzihovsky, Kaden Hazzard

Welcome, introduction and School overview

9:00 – 10:30

Eric Cornell

Cooling, trapping: BEC & recent developments I

10:30 – 11:00

Coffee Break

11:00 – 12:30

Antoine Browaeys (19:00, Paris)

Rydberg atoms in optical tweezers I

12:30 – 13:45

Participants' introductions and lunch

14:00 – 15:30

Jun Ye (14:00.00.00.00..., Jun time)

Molecules, clocks, metrology I

Tuesday, July 6th

9:00 – 10:30

Antoine Browaeys (17:00 Paris)

Rydberg atoms in optical tweezers II

10:30 – 11:00

Coffee Break

11:00 – 12:30

Eric Cornell

Cooling, trapping: BEC & recent developments II

12:30 – 13:45

Lunch

16:00 – 17:30

Meera Parish (8:00 Wednesday, Monash)

BEC/BCS crossover & imbalanced Fermi gas I

19:00 – 20:00

Public lecture

Wolfgang Ketterle (21:00 Cambridge)

New forms of matter near absolute zero temperature

Wednesday, July 7th

9:00 – 10:30

Antoine Browaeys (17:00 Paris)

Rydberg atoms in optical tweezers III

10:40 – 11:00

one-minute poster I advertisements by students

11:00 – 12:30

Jun Ye

Molecules, clocks, metrology II

12:30 – 14:00

Poster session I via Gather Town over lunch

14:00 – 15:30

Randy Hulet (15:00, Houston)

Lattice fermions, magnetism imbalanced FFLO I

Thursday, July 8th

9:00 – 10:30

Randy Hulet (10:00, Houston)

Lattice fermions, magnetism imbalanced FFLO II

10:30 – 11:00

Coffee Break

11:00 – 12:30

Leo Radzihovsky

seminar: *s-wave resonant boson superfluidity*

12:30 – 13:45

Lunch

16:00 – 17:30

Meera Parish (8:00 Friday, Monash)

BEC/BCS crossover & imbalanced Fermi gas II

Friday, July 9th

9:00 – 10:30

Randy Hulet (10:00, Houston)

Lattice fermions, magnetism imbalanced FFLO III

10:30 – 11:00

Coffee Break

11:00 – 12:30

Weeks overview, discussion, Q&A

What have we learned?

12:30 – 13:45

Lunch

16:00 – 17:30

Meera Parish (8:00 Saturday, Monash)

BEC/BCS crossover & imbalanced Fermi gas III

Week 2, July 12 – 16
Magnetism, synthetic dimensions, topology, cavity QED, and Floquet

Monday, July 12th

9:00 – 10:30	Sebastian Diehl (17:00, Cologne) <i>Keldysh and Lindblad dynamics I</i>
10:30 – 11:00	Coffee Break
11:00 – 12:00	Jun Ye <i>Molecules, clocks, metrology III</i>
12:30 – 13:45	Lunch
14:00 – 15:30	David Huse (16:00, Princeton) <i>Many-body localization, dynamics I</i>
16:00 – 17:30	Chris Monroe (13:00, College Park) <i>Quantum computation with atoms and ions I</i>

Tuesday, July 13th

9:00 – 10:30	Sebastian Diehl (17:00, Cologne) <i>Keldysh and Lindblad dynamics II</i>
10:30 – 11:00	Coffee Break
11:00 – 12:30	Sebastian Diehl (19:00, Cologne) <i>Keldysh and Lindblad dynamics III</i>
12:30 – 13:45	Lunch
14:00 – 15:30	Chris Monroe (16:00, College Park) <i>Quantum computation with atoms and ions II</i>

Wednesday, July 14th

9:00 – 10:30	Tilman Esslinger (17:00, Zurich) <i>Synthetic dimensions, Floquet dynamics I</i>
10:40 – 11:00	one-minute poster II advertisements by students
11:00 – 12:30	Nigel Cooper (18:00, Cambridge) <i>Quantum Hall, topological insulators, dynamics I</i>
12:30 – 14:00	Poster session II via Gather Town over lunch
14:00 – 15:30	David Huse (16:00, Princeton) <i>Many-body localization, dynamics III</i>

Thursday, July 15th

9:00 – 10:30

Nigel Cooper (16:00, Cambridge)

Quantum Hall, topological insulators, dynamics II

10:30 – 11:00

Coffee Break

11:00 – 12:30

Tilman Esslinger (19:00, Zurich)

Synthetic dimensions, Floquet dynamics II

12:30 – 13:45

Lunch

14:00 – 15:30

David Huse (16:00, Princeton)

Many-body localization, dynamics II

16:00 – 17:30

Chris Monroe (18:00, College Park)

Quantum computation with atoms and ions III

Friday, July 16th

9:00 – 10:30

Tilman Esslinger (17:00, Zurich)

Synthetic dimensions, Floquet dynamics III

10:30 – 11:00

Coffee Break

11:00 – 12:30

John Bollinger

seminar: *Trapped ions*

12:30 – 13:45

Lunch

14:00 – 15:30

Nigel Cooper (21:00, Cambridge)

Quantum Hall, topological insulators, dynamics III

15:45 – 16:45

Weeks overview, discussion, Q&A

What have we learned?

Week 3, July 19 – 23
Nonequilibrium dynamics, quantum gas microscopy, entanglement, and many-body localization

Monday, July 19th

9:00 – 10:30

Ana Maria Rey

SU(N) magnets with Alkaline-earth atoms I

10:30 – 11:00

Coffee Break

11:00 – 12:30

Adam Kaufman

seminar: Alkaline earth atoms in optical tweezers

12:30 – 13:00

Lunch

13:00 – 14:00

Leo Radzihovsky

seminar: *p*-wave resonant boson superfluidity

14:00 – 15:30

Alexey Gorshkov (16:00, College Park)

Quantum optics and information I

Tuesday, July 20th

9:00 – 10:30

Ehud Altman (8:00, Berkeley)

Scrambling, MBL, open quantum dynamics I

10:30 – 11:00

Coffee Break

11:00 – 12:30

Waseem Bakr (13:00, Princeton)

Quantum gas microscopy I

12:30 – 13:45

Lunch

14:00 – 15:30

Alexey Gorshkov (16:00, College Park)

Quantum optics and information II

Wednesday, July 21th

9:00 – 10:30

Alexey Gorshkov (11:00, College Park)

Quantum optics and information III

10:40 – 11:00

one-minute poster II advertisements by students

11:00 – 12:30

Waseem Bakr (13:00, Princeton)

Quantum gas microscopy II

12:30 – 14:00

Poster session III via Gather Town over lunch

14:00 – 15:30

Ana Maria Rey

SU(N) magnets with Alkaline-earth atoms II

Thursday, July 22th

9:00 – 10:30

Ehud Altman (8:00, Berkeley)

Scrambling, MBL, open quantum dynamics II

10:30 – 11:00

Coffee Break

11:00 – 12:30

Konrad Lehnert

seminar: *Frontiers of opto-mechanics*

12:30 – 13:45

Lunch

14:00 – 15:30

Ian Spielman (16:00, College Park)

seminar: *Synthetic magnetic fields*

Friday, July 23th

9:00 – 10:30

Ehud Altman (8:00, Berkeley)

Scrambling, MBL, open quantum dynamics III

10:30 – 11:00

Coffee Break

11:00 – 12:30

Waseem Bakr (13:00, Princeton)

Quantum gas microscopy III

12:30 – 13:45

Lunch

14:00 – 15:00

Weeks overview, discussion, Q&A

What have we learned?

Week 4, July 26 – 30
Gauge fields, low-dimensional systems, dynamics, ultracold chemistry, and quantum computation

Monday, July 26th

9:00 – 10:30 **Immanuel Bloch** (17:00, Munich)
Many-body localization, dynamics experiments I

10:30 – 11:00 Coffee Break

11:00 – 12:30 **Thierry Giamarchi** (19:00, Geneva)
Low dimensional quantum gases I

12:30 – 13:45 Lunch

14:00 – 15:30 **James Thompson**
Cavity QED systems: metrology with collective states I

16:00 – 17:30 **Kadden Hazzard** (17:00, Houston)
seminar: Synthetic dimension: ultracold molecules, Rydberg atoms, and momentum-space lattices

Tuesday, July 27th

9:00 – 10:30 **Immanuel Bloch** (17:00, Munich)
Many-body localization, dynamics experiments II

10:30 – 11:00 Coffee Break

11:00 – 12:30 **Thierry Giamarchi** (19:00, Geneva)
Low dimensional quantum gases II

12:30 – 13:45 Lunch

14:00 – 15:30 **James Thompson**
Cavity QED systems: metrology with collective states II

Wednesday, July 28th

9:00 – 10:30 **Monika Aidelsburger** (17:00, Munich)
Gauge fields and spin-orbit coupling I

10:30 – 11:00 Coffee Break

11:00 – 12:30 **Immanuel Bloch** (19:00, Munich)
Many-body localization, dynamics experiments III

12:30 – 13:45 Lunch

14:00 – 15:30 **James Thompson**
Cavity QED systems: metrology with collective states III

16:00 – 17:30 **Ana Asenjo** (18:00, New York)
seminar: Atom-light interactions

Thursday, July 29th

9:00 – 10:30

Monika Aidelsburger (17:00, Munich)

Gauge fields and spin-orbit coupling II

10:30 – 11:00

Coffee Break

11:00 – 12:30

Thierry Giamarchi (19:00, Geneva)

Low dimensional quantum gases III

12:30 – 13:45

Lunch

14:00 – 15:30

Kang-Kuen Ni (16:00, Boston)

Microtrapped molecules and ultracold chemistry I

Friday, July 30st

9:00 – 10:30

Monika Aidelsburger (17:00, Munich)

Gauge fields and spin-orbit coupling III

10:30 – 11:00

Coffee Break

11:00 – 12:30

Kang-Kuen Ni (13:00, Boston)

Microtrapped molecules and ultracold chemistry II

12:30 – 13:45

Lunch

14:00 – 15:30

What did we learn this month?

Overview, discussion & feedback -> adjourn