CERN Summer Student Lecture Programme 2023

Eva Sicking, Matthew McCullough for the SSLP committee

CERN
July 27, 2023

Eva Sicking (EP)
Matthew McCullough (TH)
Francesco Cerutti (SY)
Andrea Valassi (IT)
Giovanni Petrucciani (EP)
Bernhard Holzer (BE)
Wilke Van Der Schee (TH)
Ana Dordevic (IR)
Barbara Binder (HR)
Anastasija Preobrazenska (HR)
Caroline Debetaz (HR)
Kristina Gunne (IT)
CERN summer student programme since 1962

- Long tradition of CERN summer student lectures
- Lectures by world experts in their fields
Overview

First in-person lecture programme since 2019

Lecture concept
- Introduction to all areas of CERN’s research mission
- Targets students in Physics, Engineering, and Computer Science
- Prerequisite: basic background in Physics and Math
- Coverage: from basic foundations to highly specialised topics

Key data for 2023
- 500/1-001 - Main Auditorium
- 27 June - 28 July, 9h15 - 12h30
- 3 lectures per day
  - 45 min lecture
  - 10 min questions
  - 15 min coffee break between lectures

Time table in indico
## 25 topics in 5 weeks

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/6</td>
<td>27/6</td>
<td>28/6</td>
<td>29/6</td>
<td>30/6</td>
<td>3/7</td>
</tr>
<tr>
<td>09h15-10h10</td>
<td>Introduction</td>
<td>Particle World</td>
<td>Raw Data to Physics Results</td>
<td>Detectors</td>
<td>Accelerator Challenges 1</td>
</tr>
<tr>
<td>10h30-11h30</td>
<td>Particle World</td>
<td>Detectors</td>
<td>Particle World</td>
<td>Raw Data to Physics Results</td>
<td>Statistics</td>
</tr>
<tr>
<td>11h30-12h30</td>
<td>Detectors</td>
<td>Raw Data to Physics Results</td>
<td>Detectors</td>
<td>Particle World</td>
<td>Accelerators + Beam Dynamics</td>
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</table>

<table>
<thead>
<tr>
<th>Week 2</th>
<th>3/7</th>
<th>4/7</th>
<th>5/7</th>
<th>6/7</th>
<th>7/7</th>
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</thead>
<tbody>
<tr>
<td>09h15-10h10</td>
<td>Accelerator Challenges 1</td>
<td>Statistics</td>
<td>Standard Model</td>
<td>Statistics</td>
<td>Accelerators + Beam Dynamics</td>
</tr>
<tr>
<td>10h30-11h30</td>
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<td>Standard Model</td>
<td>Statistics</td>
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<td>Standard Model</td>
<td>Accelerator Challenges 1</td>
<td>Accelerators + Beam Dynamics</td>
<td>Standard Model</td>
<td>Statistics</td>
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<table>
<thead>
<tr>
<th>Week 3</th>
<th>10/7</th>
<th>11/7</th>
<th>12/7</th>
<th>13/7</th>
<th>14/7</th>
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</thead>
<tbody>
<tr>
<td>09h15-10h10</td>
<td>Nuclear Physics</td>
<td>Future Colliders</td>
<td>Cosmology</td>
<td>Heavy Ion Physics</td>
<td>Theoretical Particle Physics</td>
</tr>
<tr>
<td>10h30-11h30</td>
<td>Theoretical Particle Physics</td>
<td>Nuclear Physics</td>
<td>Heavy Ion Physics</td>
<td>Theoretical Particle Physics</td>
<td>Cosmology</td>
</tr>
<tr>
<td>11h30-12h30</td>
<td>Future Colliders</td>
<td>Theoretical Particle Physics</td>
<td>Theoretical Particle Physics</td>
<td>Cosmology</td>
<td>Heavy Ion Physics</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Week 4</th>
<th>17/7</th>
<th>18/7</th>
<th>19/7</th>
<th>20/7</th>
<th>21/7</th>
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</thead>
<tbody>
<tr>
<td>09h15-10h10</td>
<td>Accelerator Challenges 2</td>
<td>Flavour Physics</td>
<td>Astroparticle Physics</td>
<td>Accelerator Challenges 3</td>
<td>Physics at Hadron Colliders</td>
</tr>
<tr>
<td>10h30-11h30</td>
<td>Physics at Hadron Colliders</td>
<td>Accelerator Challenges 2</td>
<td>Flavour Physics</td>
<td>Physics at Hadron Colliders</td>
<td>Accelerator Challenges 3</td>
</tr>
<tr>
<td>11h30-12h30</td>
<td>Flavour Physics</td>
<td>Physics at Hadron Colliders</td>
<td>Medical Applications</td>
<td>Astroparticle Physics</td>
<td>Medical Applications</td>
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<thead>
<tr>
<th>Week 5</th>
<th>24/7</th>
<th>25/7</th>
<th>26/7</th>
<th>27/7</th>
<th>28/7</th>
</tr>
</thead>
<tbody>
<tr>
<td>09h15-10h10</td>
<td>Predictions at Hadron Colliders</td>
<td>Antimatter</td>
<td>Electronics, DAQ and Triggers</td>
<td>Beyond the Standard Model</td>
<td>Electronics, DAQ and Triggers</td>
</tr>
<tr>
<td>10h30-11h30</td>
<td>Physics at Lepton Colliders</td>
<td>Beyond the Standard Model</td>
<td>Predictions at Hadron Colliders</td>
<td>String Theory</td>
<td>Beyond the Standard Model</td>
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<tr>
<td>11h30-12h30</td>
<td>Antimatter</td>
<td>Physics at Lepton Colliders</td>
<td>Beyond the Standard Model</td>
<td>Electronics, DAQ and Triggers</td>
<td>Closing</td>
</tr>
</tbody>
</table>
Invitation to actively participate

● Follow the lectures actively
  ○ Think of one question to ask in each lecture
  ○ Discuss with lecturers and fellow students

● Explore full scope of topics
  ○ Attend also lectures far from your main field of interest

● Remark:
  ○ Zoom connection available for students who could not come to CERN for exceptional circumstances
  ○ Lectures also accessible to the public (Webcast, recordings)
Ongoing renovation of building 60

- Demolition phase from May to September 2023
- Expect some level of noise from
  - Remediation & demolition work (red zone)
  - Extractors (V)

- Noise propagation into main auditorium difficult to estimate
- SSLP team in contact with responibles for renovation in case noise starts impacting lectures
Lecture survey

- You will be asked to fill one (anonymous) questionnaire for each course
- Evaluation will be reviewed by the lecture programme committee
- Used as input to improve the programme

Example evaluation of lecture in 2022

<table>
<thead>
<tr>
<th></th>
<th>Content</th>
<th>Presentation</th>
<th>Level</th>
<th>Relevance</th>
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</thead>
<tbody>
<tr>
<td>Thursday</td>
<td>3.76</td>
<td>3.96</td>
<td>2.16</td>
<td>3.60</td>
</tr>
</tbody>
</table>

2. Of some interest  2. Fair  2. Just right  2. Somewhat irrelevant

This is the last lecture of the speaker.
Please fill out the feedback survey if not yet done.
Thank you! 😊
CERN organisers behind the SSLP

● Lecture programme coordinated by representatives from several CERN departments:
  ○ Eva Sicking (Experimental Physics): co-chair (eva.sicking@cern.ch)
  ○ Matthew McCullough (Theoretical Physics): co-chair (matthew.mccullough@cern.ch)
  ○ Francesco Cerutti (Accelerator Systems)
  ○ Andrea Valassi (Information Technology)
  ○ Giovanni Petrucciani (Experimental Physics)
  ○ Bernhard Holzer (Beams)
  ○ Wilke Van Der Schee (Theoretical Physics)
  ○ Ana Dordevic (International Relations)
  ○ Barbara Binder (Human Resources)
  ○ Anastasija Preobrazenska (Human Resources)
  ○ Caroline Debetaz (Human Resources)
  ○ Kristina Gunne (Information Technology)

● For administrative questions: summer.student.info@cern.ch
We wish you a great summer student programme!