



Gallery View

Participants (3)

- wulzer (me)
- eszter.badinova@cern... (Host)
- TG Thierry Gys



Invite Mute Me **Raise Hand**

Chat

eszter.badinova@cern.ch

Mute Stop Video **Participants** **Chat** Share Screen Record Reactions Leave

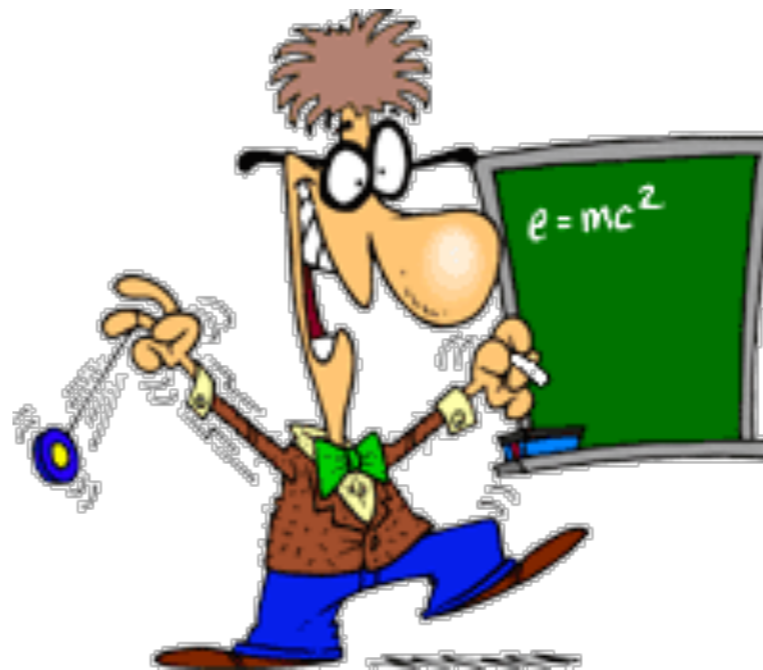
To: Everyone Type message here...

# Online CERN Summer Student Lecture Program 2020

Thierry Gys  
**Andrea Wulzer**

on behalf of the SSLP committee →

**Ezter Badinova (IR)**  
Gabriela Kopecka (HR)  
Adriana Bejaoui (HR)  
Francesco Cerutti (EN)  
Maria Girone (IT)  
Richard Hawkings (EP)  
Bernhard Holzer (BE/ABP)



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Aim is not to teach you how to, e.g. build an accelerator.

We give you basic **concepts** and **ideas**, to further stimulate your interest in science.

# Programme Overview

A simple scheme ...



## Accelerator

Particle Accelerators and beam dynamics  
Accelerator technology challenges  
Future high-energy collider projects

## Detectors

Detectors  
Electronics, DAQ and triggers

## Experiment

Particle World  
From raw data to physics results  
Experimental physics at hadron colliders  
Experimental physics at lepton colliders  
Physics and medical applications  
Heavy Ions  
Nuclear Physics at CERN  
Flavour Physics  
Antimatter in the lab

## Theory

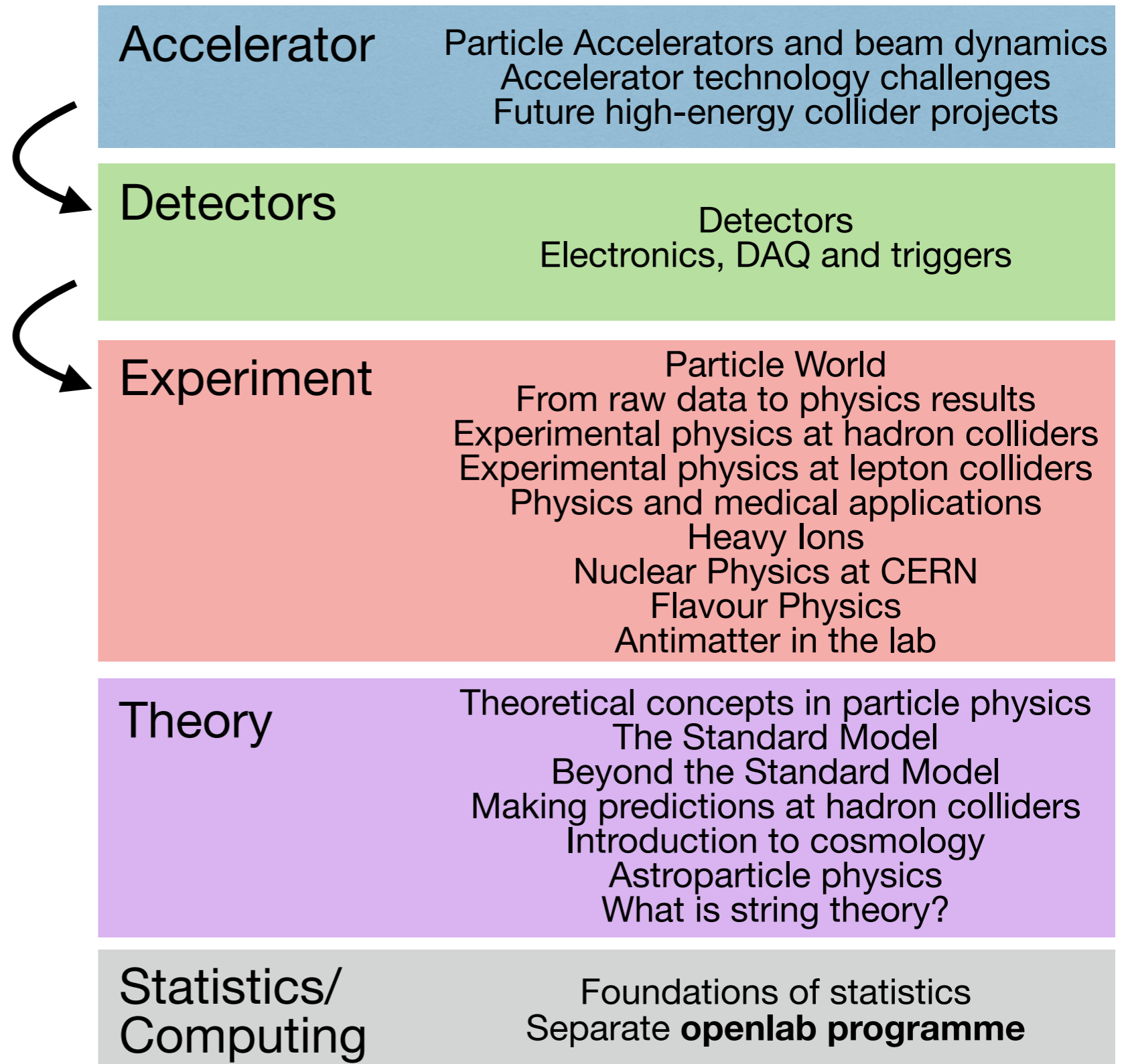
Theoretical concepts in particle physics  
The Standard Model  
Beyond the Standard Model  
Making predictions at hadron colliders  
Introduction to cosmology  
Astroparticle physics  
What is string theory?

## Statistics/ Computing

Foundations of statistics  
Separate **openlab programme**

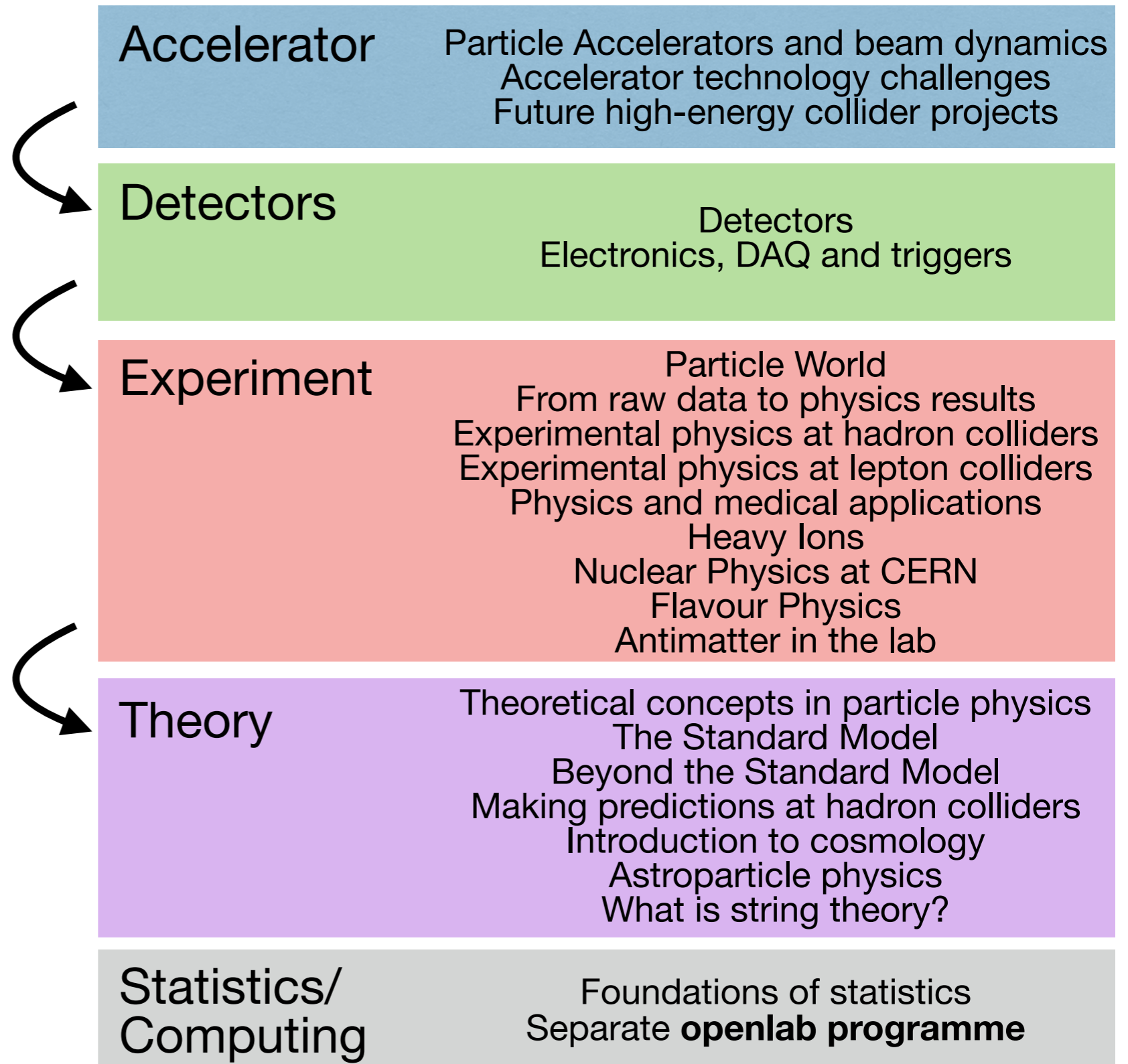
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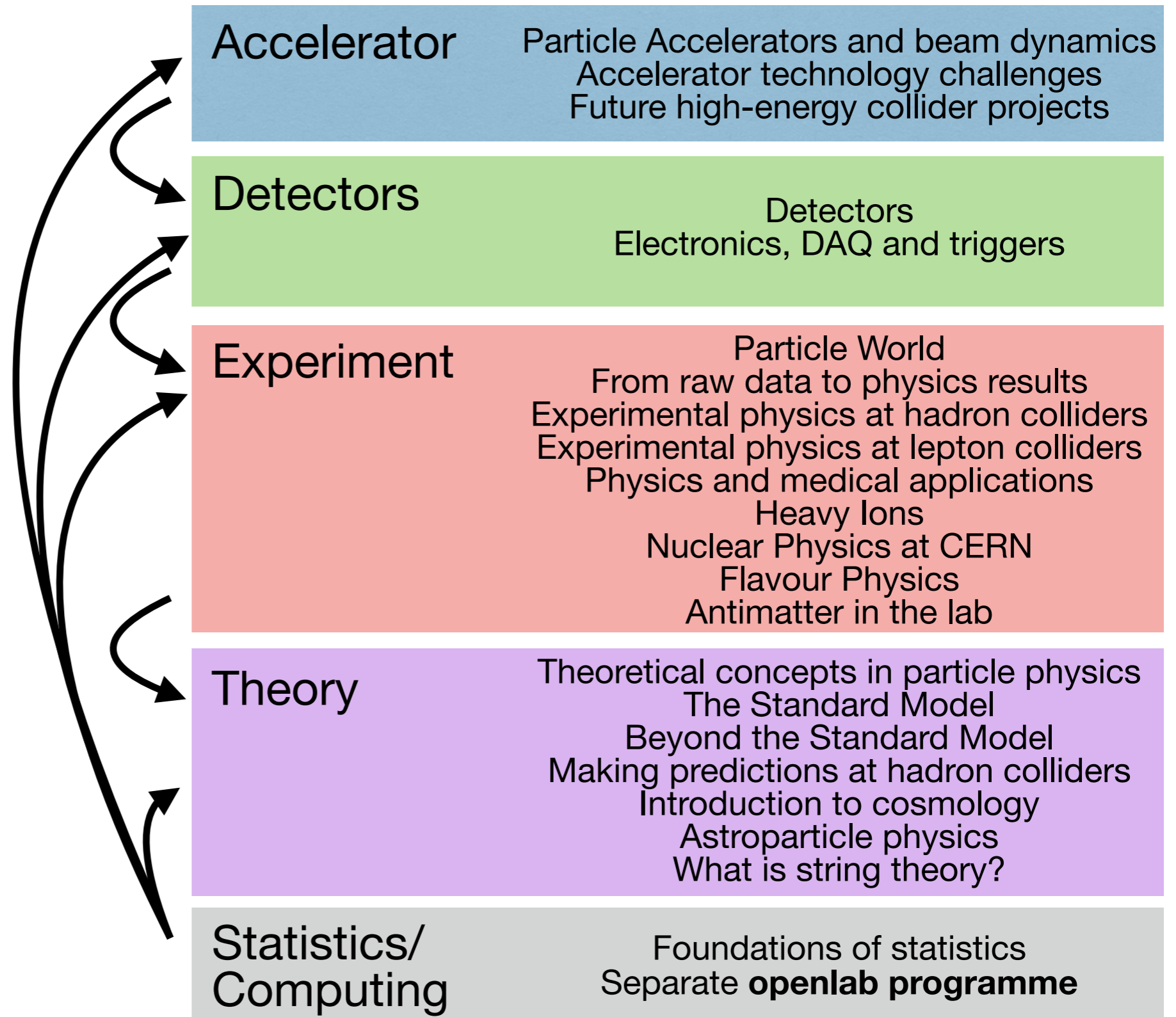
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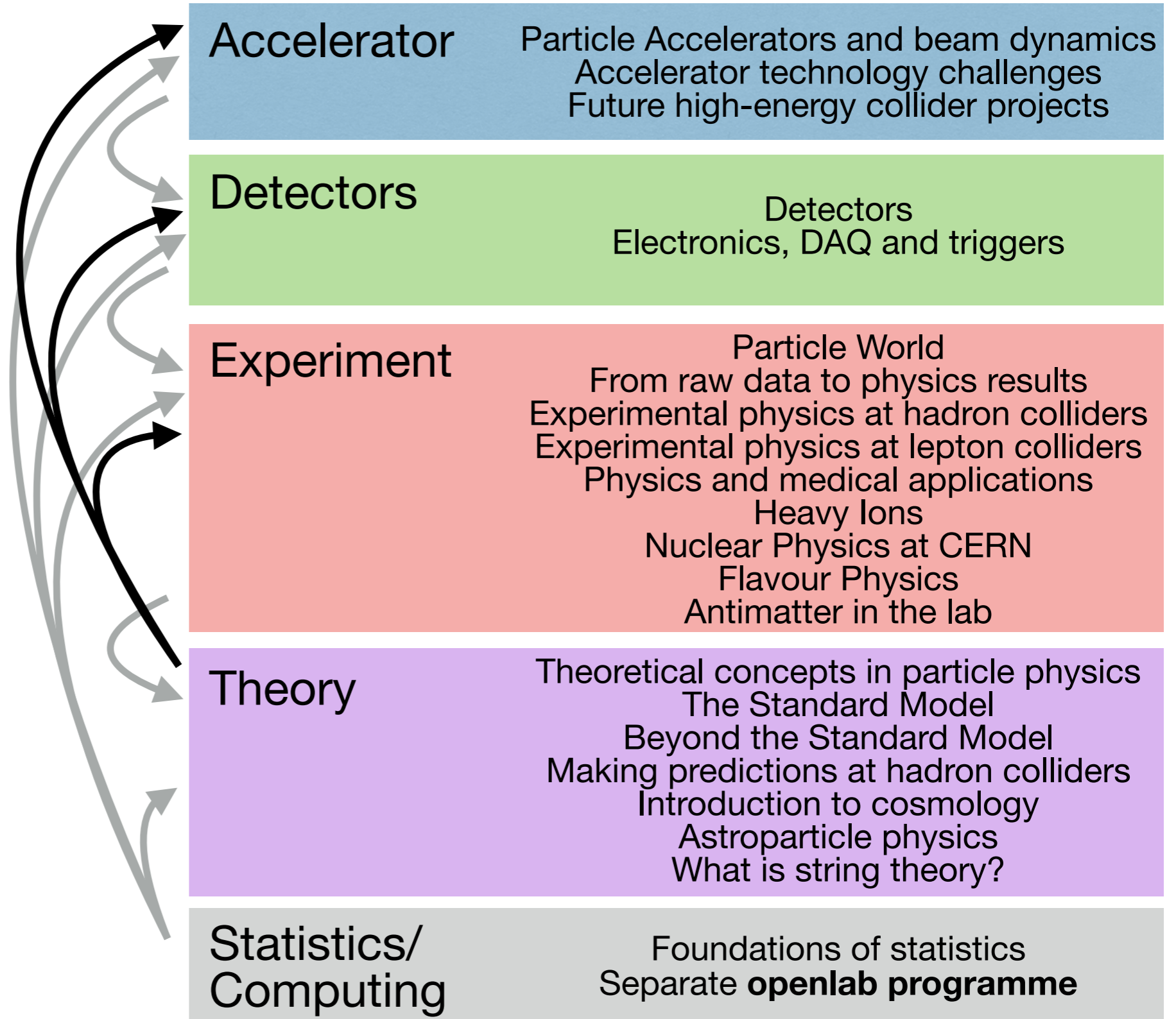
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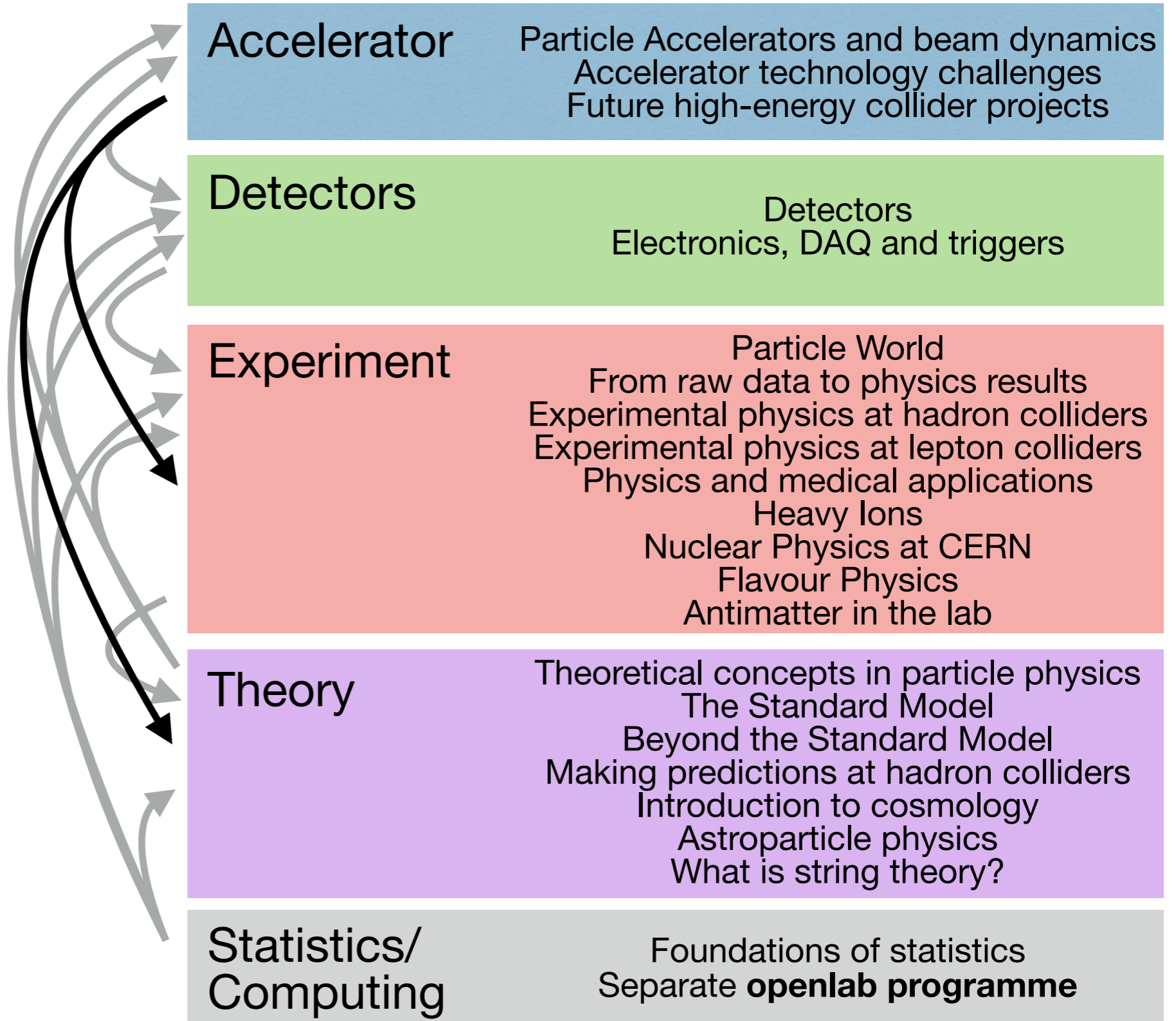
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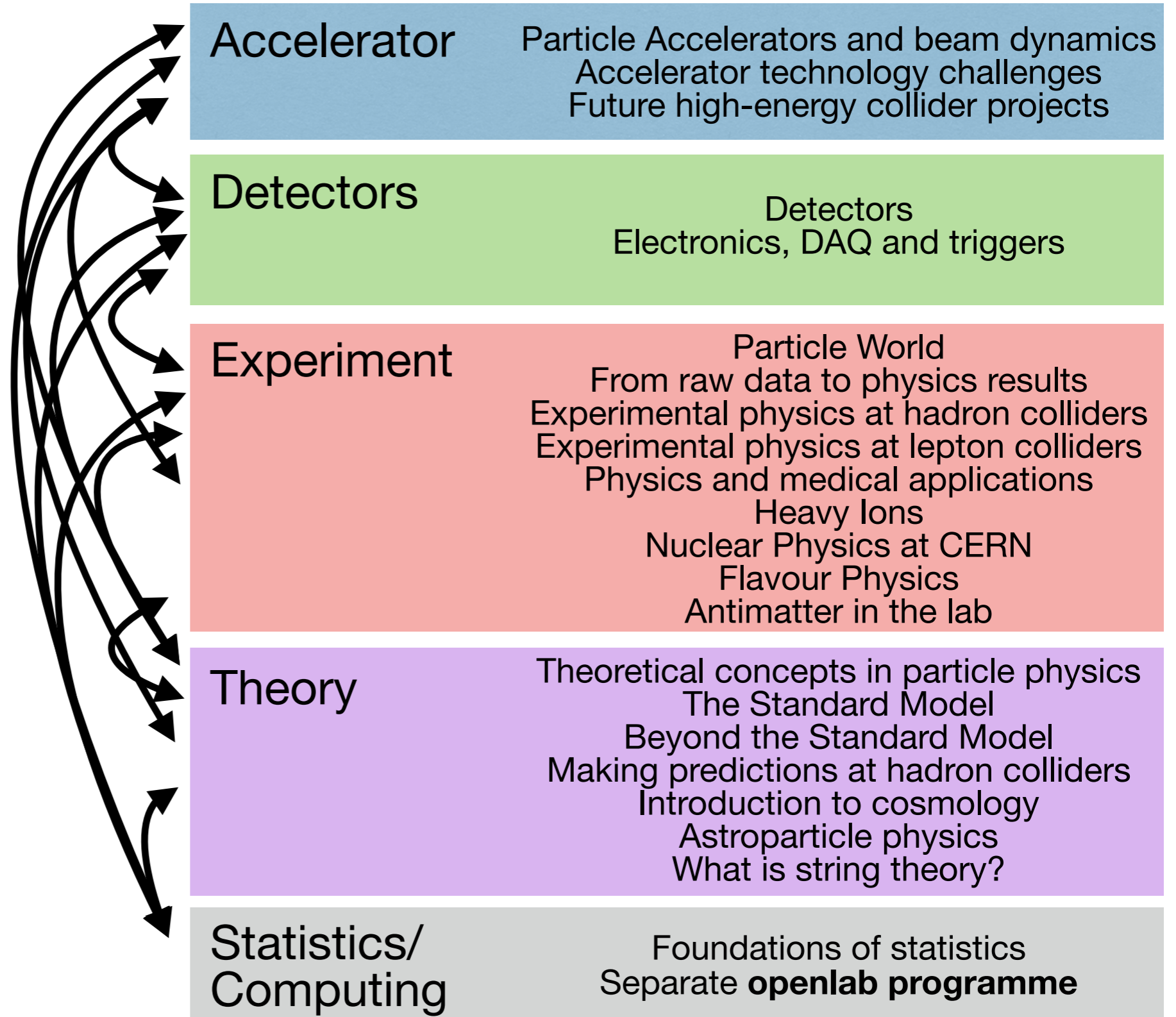




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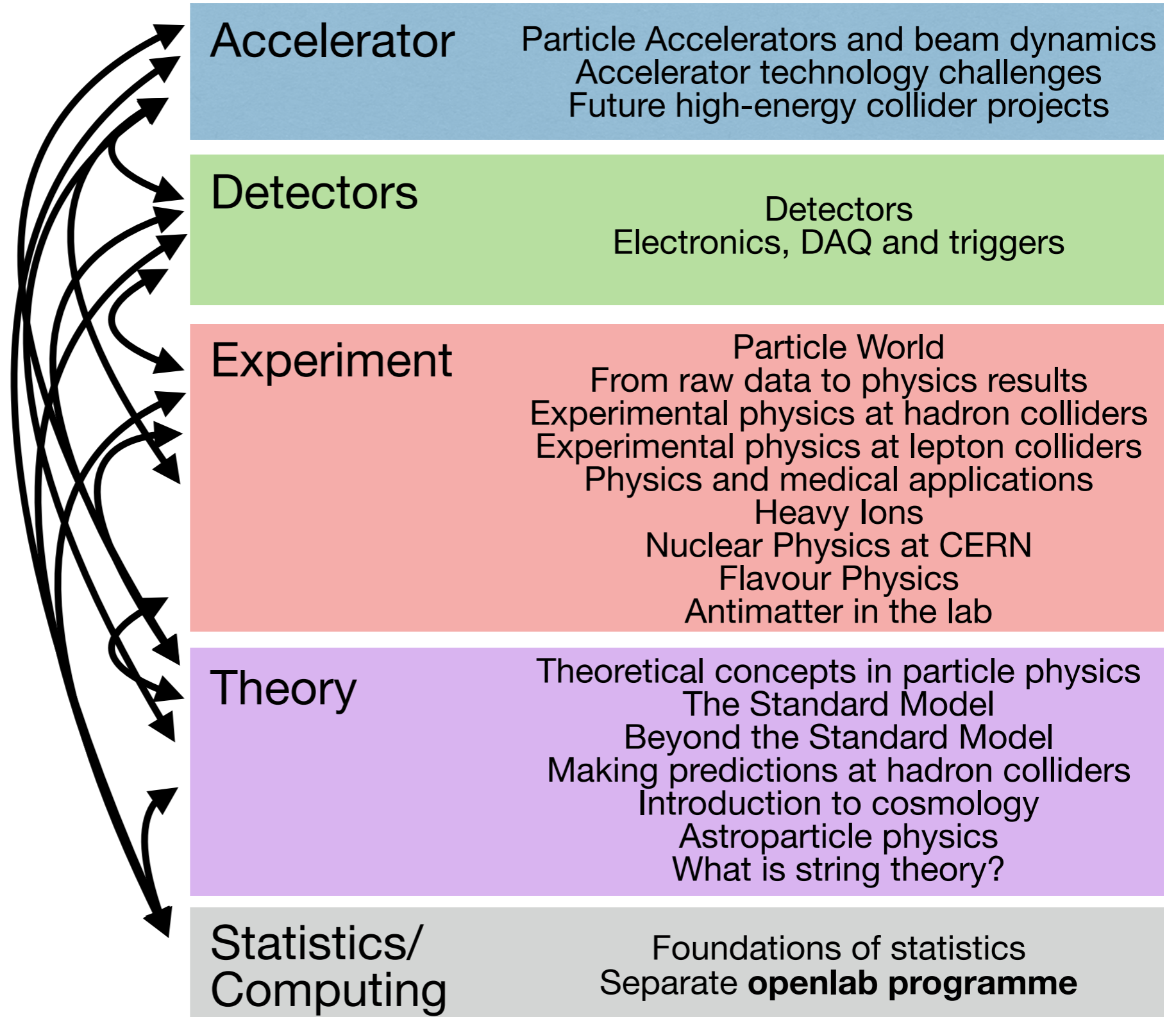


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All subjects are  
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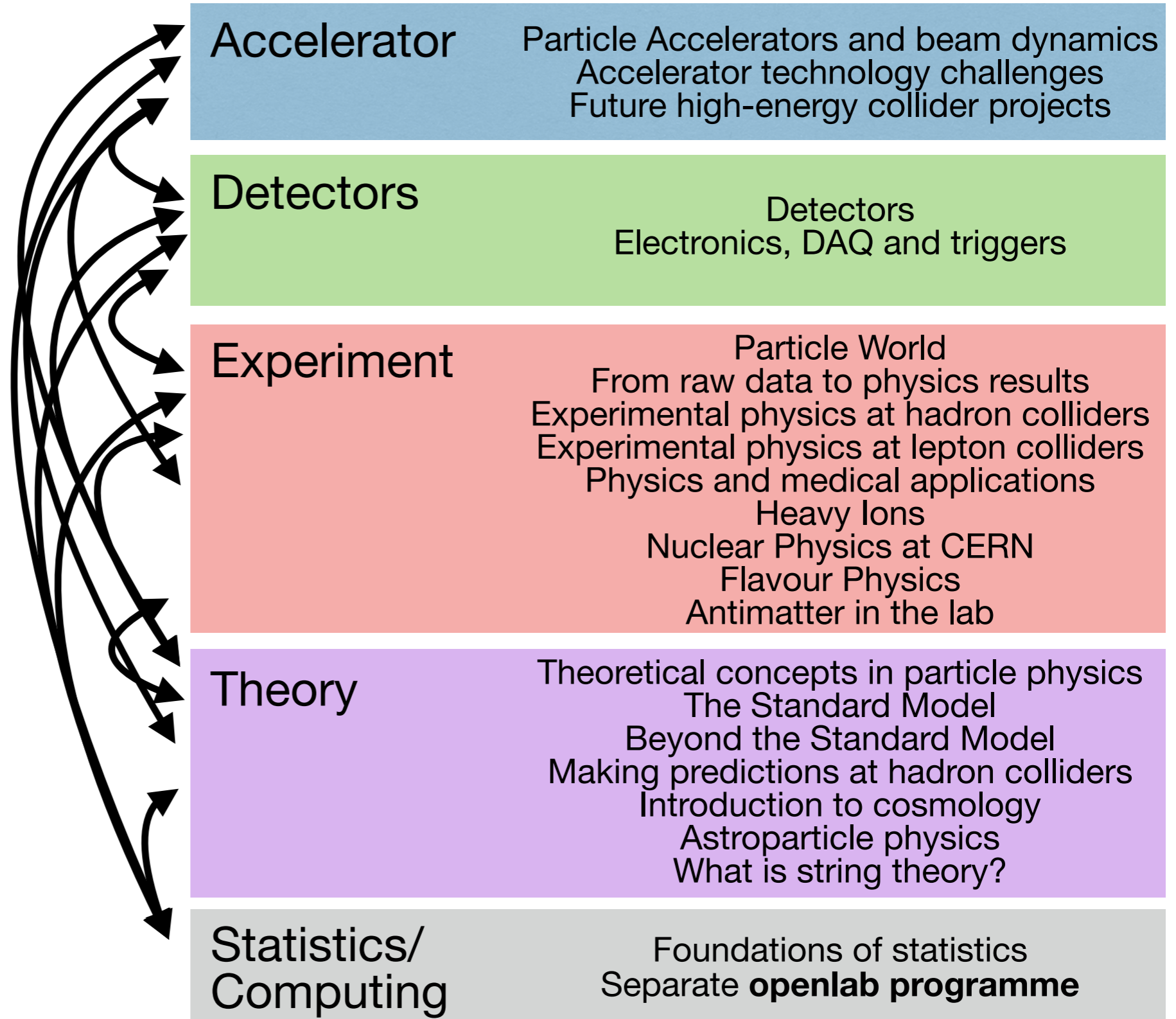
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CERN is great because  
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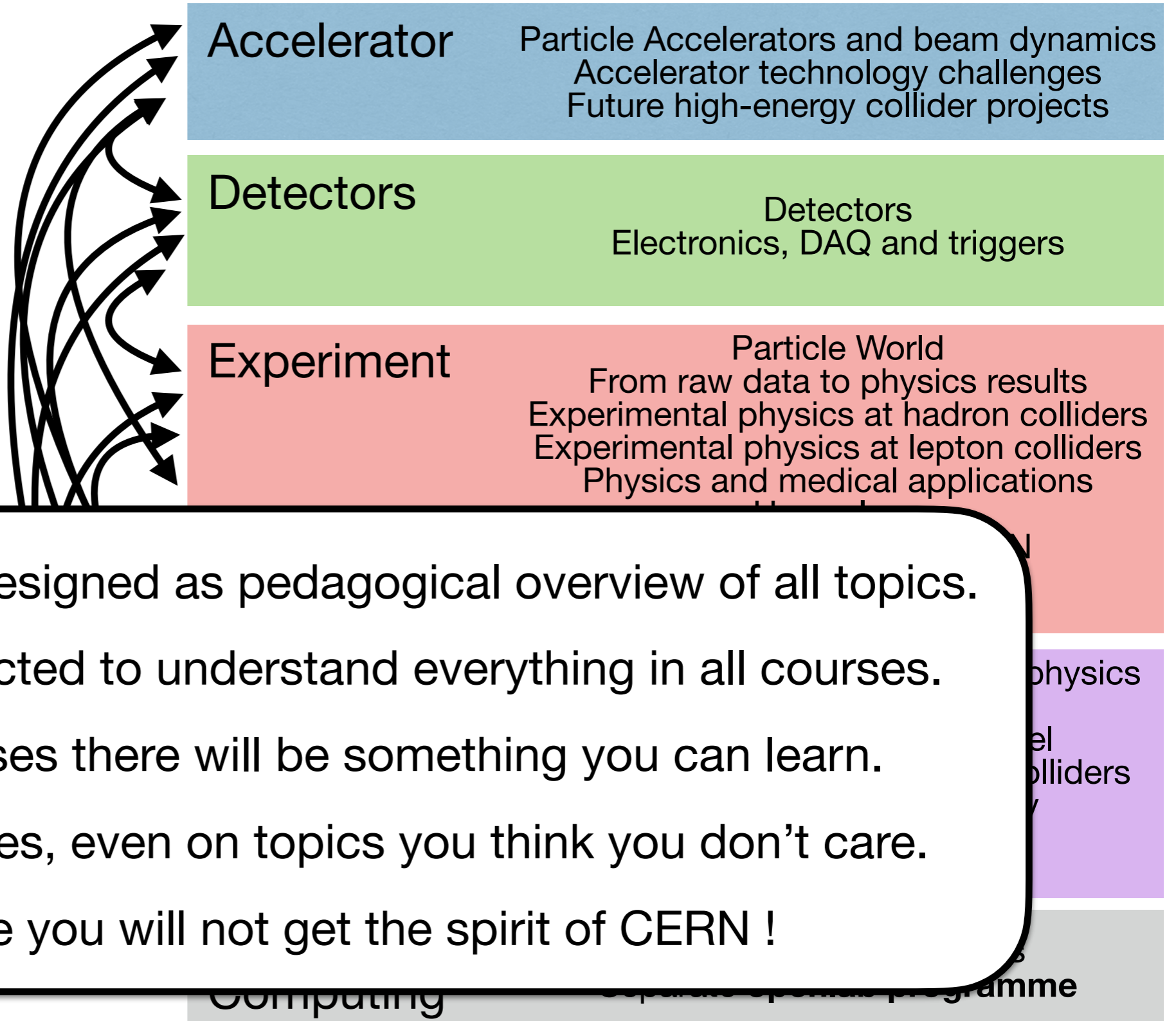
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Lecture program designed as pedagogical overview of all topics.

You are not expected to understand everything in all courses.

But in all courses there will be something you can learn.

Watch the lectures, even on topics you think you don't care.

Otherwise you will not get the spirit of CERN !

# Practical Information

Homepage of the online program (based on 2019 recorded lectures):  
<https://summerstudent.web.cern.ch/lectures-2020>

## Watch the lectures

- Follow the order on the webpage.
- If you experience problems with the videos, and/or with the links, let us know immediately!! [summer.student.info@cern.ch](mailto:summer.student.info@cern.ch) [nms.summerstudent@cern.ch](mailto:nms.summerstudent@cern.ch)

## Register for the Q&A Sessions

- **Post** your questions. As soon as possible. **First Come, First Answered**
- **Attend Live Q&A Session**, with the 2019 lectures
- You can ask clarifications, and interact with the lecturer
- You can ask also “live” questions, if time allows

**Hint:** Not to forget the Q&A sessions, and not to get lost with timezones,  
[save the events in your calendar](#)

# Disclaimer

It is the first (last?) time we run the program online.

Because of the special circumstances, we are all part of a pedagogical experiment!

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Because of the special circumstances, we are all part of a pedagogical experiment!

We are sure you would have preferred to be physically here, as much as we would have preferred to welcome you in person.

We wish you to have the opportunity to come to CERN, at some point !



# Online educational activities in 2020

Maria Girone, CERN openlab CTO

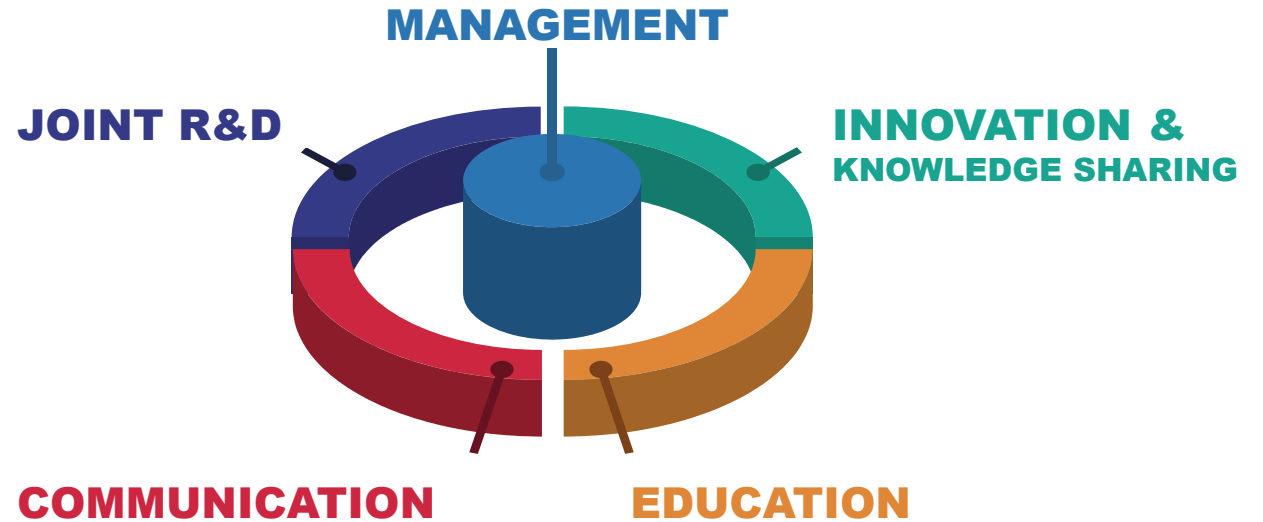
06/07/2020



# CERN openlab's mission

*Our recipe for success*

- **Evaluate** state-of-the-art technologies in a challenging environment and improve them.
- **Test** in a research environment today technologies that will be used in many business sectors tomorrow.
- **Train** the next generation of engineers/researchers.
- **Promote** education and cultural exchanges.
- **Communicate** results and reach new audiences.
- **Collaborate** and exchange ideas to create knowledge and innovation.



# Online Educational Activities in 2020



**Online hackathon:** CERN annual Webfest: 27-28 June

<https://webfest-online.web.cern.ch/>.



**Online lecture programme:** <https://openlab.cern/online-learning>



**Online tutorials:** <https://openlab.cern/online-learning> (registration needed)



**LIVE Q&A sessions** (with submission link for questions, registration needed)

**16 July:** <https://indico.cern.ch/event/932557/>

**30 July:** <https://indico.cern.ch/event/932558/>

# CERN Webfest

A very successful event!

- Held online for the first time;
- New theme: “**working together apart: accelerating collaboration**”;
- Over **400** people from **75** countries signed up;
- **31** projects submitted: available at [webfest.cern/projects](http://webfest.cern/projects);
- **12** high-profile judges from different organisations;
- **7** finalists and a **1** overall winner;
- **6** workshops, delivered by experts from CERN; + **Webfest.Fun** sessions (like Yoga, Zumba and an online DJ).



# Online Lecture Programme

*Computing in HEP* by Maria Girone, chief technology officer at CERN openlab.

Introduction: <https://indico.cern.ch/event/825684/>

Video: <https://cds.cern.ch/record/2721017>

*Evolution in Computing Hardware* by Sverre Jarp, honorary staff at CERN, former CTO at CERN openlab.

Introduction: <https://indico.cern.ch/event/831811/>

Video: <https://cds.cern.ch/record/2721999>

*Evolution in Computing Hardware - Part 2* by Andrzej Nowak, management consultant and entrepreneur.

Introduction: <https://indico.cern.ch/event/831853/>

Video: <https://cds.cern.ch/record/2683861>

*DAQ: Filtering data from 1 PB/s to 600 MB/s* by Tommaso Colombo of the LHCb Experiment.

Introduction: <https://indico.cern.ch/event/825688/>

Video: <https://cds.cern.ch/record/2681294>

*From raw data to physics results* by Paul James Laycock of the Belle II Experiment and Brookhaven National Laboratory, US.

Introduction: <https://indico.cern.ch/event/829969/>

Video 1: <https://cds.cern.ch/record/2682788>

Video 2: <https://cds.cern.ch/record/2683008>

Video 3: <https://cds.cern.ch/record/2683244>

*Computer security in 2019* by Sebastian Lopienski, CERN deputy computer security officer.

Introduction: <https://indico.cern.ch/event/825691/>

Video: <https://cds.cern.ch/record/2681341>

# Online Lecture Programme

**Introduction to machine learning** by Michael Aaron Kagan of the ATLAS Experiment and the SLAC National Accelerator Laboratory, US.

Introduction: <https://indico.cern.ch/event/831643/>

Video: <https://cds.cern.ch/record/2681770>

**Introduction to HPC with GPUs** by Ahmad Siar Hesam of CERN openlab.

Introduction: <https://indico.cern.ch/event/829978/>

Video: <https://cds.cern.ch/record/2683426>

**Deep learning, hands-on** by Sofia Vallecorsa, a physicist at CERN openlab.

Introduction: <https://indico.cern.ch/event/827972/>

Video: <https://cds.cern.ch/record/2683695>

**How to build a large-scale agent-based simulator** by Lukas Breitwieser of CERN openlab and the BioDynaMo project team.

Introduction: <https://indico.cern.ch/event/829976/>

Video: <https://cds.cern.ch/record/2686659>

**Containers and Orchestration with Docker and Kubernetes** by Ricardo Brito Da Rocha and Spyridon Trigazis, both of the CERN IT department's Compute & Monitoring group.

Introduction: <https://indico.cern.ch/event/827661/>

Video: <https://cds.cern.ch/record/2681769>

**Quantum computing for high-energy physics applications** by Federico Carminati, CERN openlab CIO.

Introduction: <https://indico.cern.ch/event/825700/>

Video: <https://cds.cern.ch/record/2681989>

# Online Tutorials and Conferences

## *Alpaka Parallel Programming.*

Event link: <https://indico.cern.ch/event/912156/>

Dates: 29 June 2020 to 3 July 2020.

## *Introduction to High-Performance Computing with GPUs* by Ahmad Siar Hesam of CERN openlab.

Event link: <https://indico.cern.ch/event/926251/>

Dates: 14 July 2020.

## *Building scalable and reliable monitoring system* by Nikolay Tsvetkov, a computing engineer at CERN.

Event link: <https://indico.cern.ch/event/930896/>

Dates: 9 July 2020.

## *SciPy2020.*

Event link: <https://www.scipy2020.scipy.org/>

Dates: 6 July 2020 to 12 July 2020.

# Contacts

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CERN openlab CIO  
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[www.cern.ch/openlab](http://www.cern.ch/openlab)

To add your name to all slides, go to Insert > Header & Footer.  
Modify the text in the footer box and then click 'Apply to all'.

# Introduction Presentation and Opening Lecture



Monday 6 Jul 2020, 15:00 → 16:30 Europe/Zurich

Andrea Wulzer (CERN and EPFL), Maria Girone (CERN), Tara Shears (University of Liverpool (GB)), Thierry Gys (CERN)

**Description** Join us for the opening session of this year's Summer Student Online Lecture Programme!

There is no need to register for this session. A Zoom link will be shared by email with the details on how to join.

**Contact** [summer.student.info@cern.ch](mailto:summer.student.info@cern.ch)  
 [nms.summerstudent@cern.ch](mailto:nms.summerstudent@cern.ch)

**15:00** → 15:15 **Welcome and Introduction to the Online Lecture Programme**

**Speakers:** Andrea Wulzer (CERN and EPFL), Thierry Gys (CERN)

🕒 15m



**15:15** → 15:20 **Introduction to CERN openlab lectures**

**Speaker:** Maria Girone (CERN)

🕒 5m



**15:20** → 16:05 **A brief tour of the Particle World**

**Speaker:** Tara Shears (University of Liverpool (GB))

🕒 45m



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