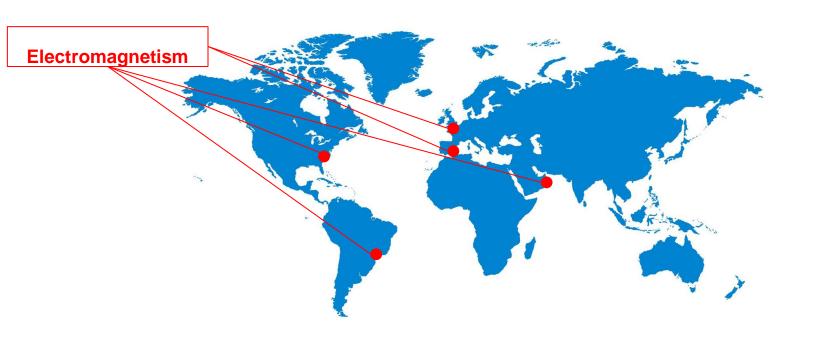
Particle Physics

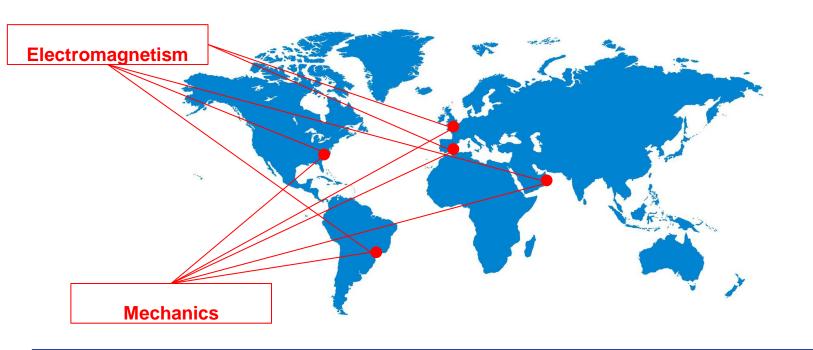
HST2024 Study Group 7













But where is Particle Physics?

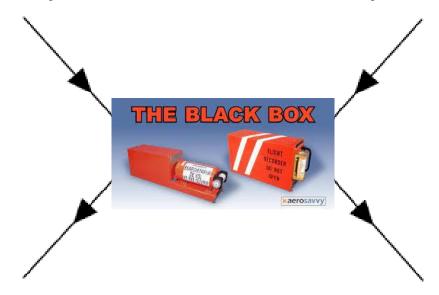


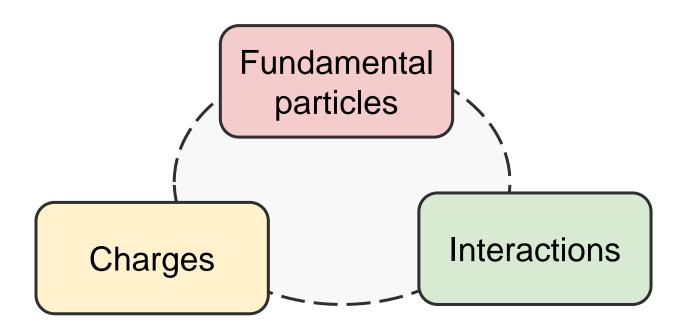
But where is Particle Physics?

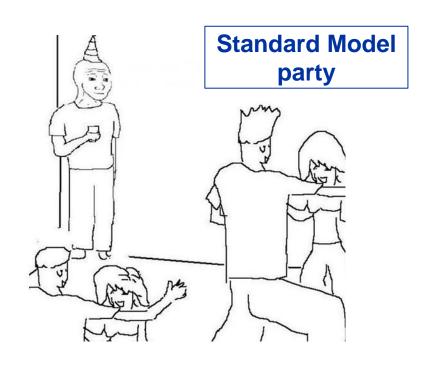


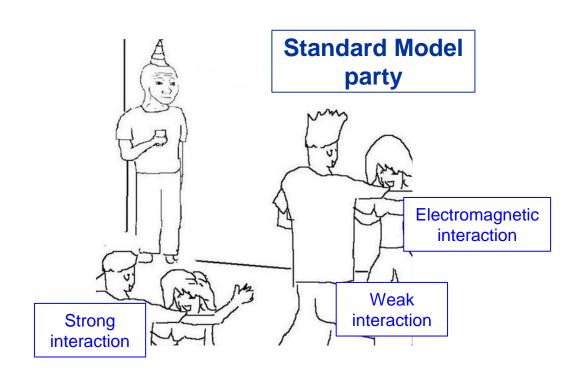
We are building a model that reproduces reality, but the model is not the reality

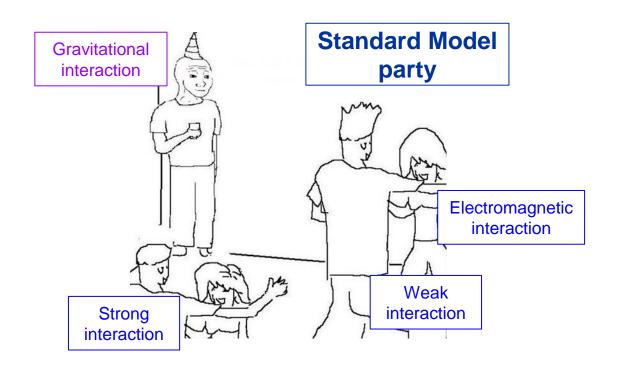


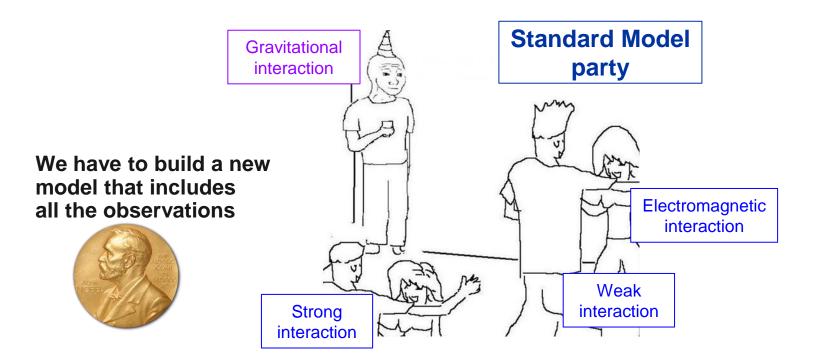












Why we are all here?





I arn very pleased to inform you that you have been selected to participate in this year's International High School Teacher Programme (HST2024), which will take place at CERN, Geneva, from Sunday, 30 June to Saturday, 13 July 2024. We look forward to welcoming you among a group of 48 teachers from 35 different I am very pleased to inform you that you have been selected to participate in this year's International High School Teacher Programme (HST2024), which will take place at CERN, Geneva, from Sunday, 30 June to Saturday, 13 July 2024. We look forward to welcoming you among a group of 48 teachers from 36 different countries. Please read the following important information carefully:

 Confirmation of your availability
Please confirm your availability to attend the whole duration of the HST2024 programme through this web form: https://indicq.cem.ch/event/1185906/surveys/530772

 Video Tools (1998) place at CERN, Geneva, from **sunday, 30 June to Saturday, 13** countries. Please read the following important information carefully:

It is very important that you confirm your participation, as there has been a large number of applications, which have not been successful. If we do not receive your like very important that you confirm your participation, as there has been a large number of applications, which have not been successful. If we do not receive your like to an applicant on the waiting list.

The very important that you confirm your participation, as there has been a large number of applications, you confirm to attend the programme in full. This also includes the very important that you confirm your participation, you confirm to attend the programme in full. This also includes the programme in full in the pro confirmation by **Nonday.** 15 April 2024, we may allocate your participants to socialise and focus on their respective study group tasks.

New York of the Walting list.

Note that we cannot accept tale arrivals or early departures By confirming your participation, you confirm to attend the programme in full. This also includes weekend during the programme, which enables all participants to socialise and focus on their respective study group tasks. Financial support.

Will provide your living costs for the duration of the HST2024 programme. Specifically, we will pay for your accommodation at the onsite CERN Hotel, and we will pay for your accommodation of the HST2024 programme.

Will provide your living costs for the duration of the HST2024 programme.

ERN will cover all your living costs for the duration of the HST2024 programme. Specifically, we will pay for your accommodation at the onsite CERN Hotel, the state of the duration of the HST2024 programme. Specifically, we will pay for your accommodation at the ST2024 programme. The state of the duration of the HST2024 programme. Specifically, we will pay for your accommodation at the onsite CERN Hotel, and the state of the state Will provide you with an anonymous prepaid card, which you can use to pay for your meals and drinks at CERN for the duration of the HST2024 programme.

All you need to arrange and finance is your travel to and from Geneva, Switzerland. Here, we encourage you to shart already researching your tocal physics society or make your travel arrangements. Furthermore, we encourage you to look for additional third-party funding, for example, from your school, your local physics society or make your travel arrangements. Furthermore, we encourage you to look for additional third-party funding. All you need to arrange and finance is your travel to and from Geneva, Switzerland. Here, we encourage you to start afready researching, your local physics society or your your travel arrangements. Furthermore, we encourage you to look for additional third-party funding, for example, from your school, your local physics society or your governments. Your government.

As amounted our website, we do have limited, priority will be given to participants from distant countries. Here, we will send out the particular application form and As announced on our website, we do have limited funds available to support a small number of teachers through a travel grant, for which all selected participants can form and apply. However, as our funds are limited, priority will be given to participants from distant countries. Here, we will send out the particular application form and apply. However, as our funds are limited, priority will be given to participants from distant countries. Here, we will send out the participants from distant countries.

 3. Accommodation request
 The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.
 The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.
 The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.
 The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.
 The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.
 The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.

The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.

The HST2024 programme will run from Sunday, 30 June (6 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.

The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.

The HST2024 programme will run from Sunday, 30 June (5 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.

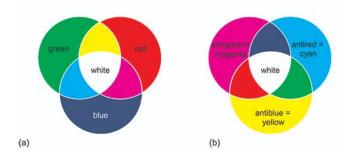
The HST2024 programme will run from Sunday, 30 June (6 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.

The HST2024 programme will run from Sunday, 30 June (6 pm) until Saturday, 13 July 2024 in the morning. However, since several participants come from distant.

The HST2024 programme will run from Sunday, 30 June (6 pm) until Saturday, 29 June (8 the satists) to Sunday, 14 July (8 the sitest), to take the various states and the satists of the satists countries. it is possible to stay at the CERN hotel from Saturday, 29 June (at the earliest) to Sunday, 14 July (at the latest), to take the various travel itineraries into account. Therefore, please investigate the best travel options for your trip to Geneva. We will ask you to specify your arrival and departure dates during the registration process in the coming weeks. 4. Scientific programme Over the next weeks and months, the programme timerary will be emerging on the HST2024 programme website (https://indico.cem.ch/e/HST2024).

Visualizing things we cannot see

- The use of pictures and analogies can be helpful and dangerous at the same time.





- Visualizing things we cannot see
 - The use of pictures and analogies can be helpful and dangerous at the same time.
- Vocabulary and correct use of words
 - Examples:
 - particle versus system of particles
 - decay versus transformation

- Visualizing things we cannot see
 - The use of pictures and analogies can be helpful and dangerous at the same time.
- Vocabulary and correct use of words
 - Examples:
 - particle versus particle system
 - decay versus transformation



- Relation between models and reality
 - Possibility of new models in the future
 - Students life will not be easy



- Visualizing things we cannot see
 - The use of pictures and analogies can be helpful and dangerous at the same time.
- Vocabulary and correct use of words
 - Examples:
 - particle versus system of particles
 - decay versus transformation
- Relation between models and reality

Useful Material & Resources

CERN

- https://cern.ch/PER
- https://www.damtp.cam.ac.uk/user/tong/particle.html
- https://atlas.physicsmasterclasses.org/en/index.htm
- Youtube: PBS Space Time channel
 - https://www.youtube.com/c/pbsspacetime
- Quarknet Data Activities
 - https://quarknet.org/data-portfolio
- Perimeter Institute
 - https://resources.perimeterinstitute.ca/collections/lessn-compilations/products/beyond-the-atom-remodelling-particle-physics?variant=17148738886

Best Practice Example

- Cloud Chamber







Where we try to see very small particles

Best Practice Examples

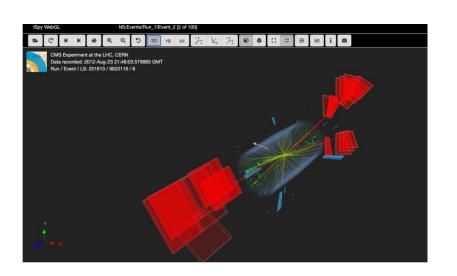
- Cloud Chamber
- Black Box (PI)



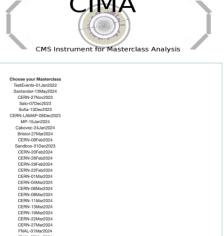


Best Practice Example

- **Cloud Chamber**
- Black Box (PI)
- **Masterclass Particle Physics**



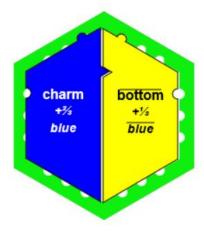


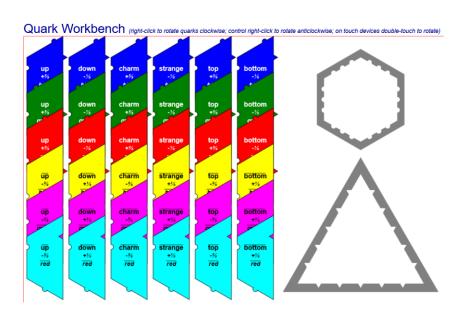




Best Practice Example

- Cloud Chamber
- Black Box (PI)
- Masterclass Particle Physics
- Quark Workbench





HST2024 Study Group 7

Gabriel (Brazil), Gunther (Belgium), Marina (Spain), Juhaina (Oman), Janet (USA)

One way in which our thinking has changed

The power of open and collaborative science!



HST2024 Study Group 7

Gabriel (Brazil), Gunther (Belgium), Marina (Spain), Juhaina (Oman), Janet (USA)

One way in which our thinking has changed

The power of open and collaborative science!



Our Favorite Things

Physics memes (M)

Friendship (Gu)

Cooperation (Ju)

Importance of teachers (Ga)

Cool Physics Learning (Ja)

We hope we didn't exceed our time so Jeff won't be sad

We hope we didn't exceed our time so Jeff won't be sad



But happy instead!



Any questions?