ECR future collider forum

Report of Contributions

https://indico.global/e/2967

Contribution ID: **1** Type: **not specified**

Reports from breakout discussions

Contribution ID: **2** Type: **not specified**

Overview of physics landscape

Friday 4 November 2022 10:15 (15 minutes)

Presenter: WARDLE, Nicholas (Imperial College (GB))

Session Classification: Physics landscape

Contribution ID: **3** Type: **not specified**

Overview of accelerator technologies and challenges

Friday 4 November 2022 11:00 (15 minutes)

Presenter: CHARLES, Tessa (University of Liverpool (GB))

Session Classification: Accelerator technologies and challenges

Contribution ID: **4** Type: **not specified**

Overview of detector technologies and challenges

Friday 4 November 2022 11:45 (15 minutes)

Presenter: HYNDS, Daniel (University of Oxford (GB))

Session Classification: Detector technologies and challenges

Contribution ID: **5** Type: **not specified**

Challenges and opportunities in theoretical physics

Friday 4 November 2022 13:30 (15 minutes)

Presenter: YOU, Tiann Tevong (Imperial College Sci., Tech. & Med. (GB))

Session Classification: Theoretical perspectives and challenges

Contribution ID: **6** Type: **not specified**

Software and computing challenges associated with future colliders

Friday 4 November 2022 14:15 (15 minutes)

Presenter: MCFAYDEN, Josh (University of Sussex)

Session Classification: Software+ computing: challenges and opportunities

Contribution ID: **7** Type: **not specified**

Discussion Session

Friday 4 November 2022 10:30 (20 minutes)

- We do not wish to discuss the details of current physics results.
- If there is no direct evidence of new physics at colliders in the coming years, where should we direct our efforts?
- What is the balance of the physics case for FCC-ee / eh / hh ?
- Addressing challenges in convincing the community to buy into the next colliders' physics programme.

From the last meeting:

- Surely we are not the generation to give up on this quest [understanding the fundamental properties of nature] because the next collider facility is challenging (echoed by Eliezer)
- Physics case should not rely on anomalous results but on measurements with a large impact we can be sure to deliver
- Getting behind a large project gives optimal chance of long term funding success
- Are we safe to work on the baseline assumption of FCCee -> hh?

Session Classification: Physics landscape

Contribution ID: **8** Type: **not specified**

Discussion Session

Friday 4 November 2022 11:15 (20 minutes)

- We do not wish to discuss the details of the current technological problems.
- The physics drivers for a future hadron collider are documented by the US 'Snowmass' (in progress), the European Particle Physics Strategy, and recently by ECFA. Where do the UK ECRs fit (or where best to position itself to make progress) in these plans?
- How best to support more speculative R&D, which may be riskier in terms of immediate benefits but which, if successful, can bring significant and potentially groundbreaking results. Can you name some 'blue-sky' ideas that are currently being discussed?
- How much of an ECR's time should be devoted to studies and R&D for future initiatives?
- What are the interests of the (UK) ECR accelerator community (e.g. hadron/electron/muon collider, linear vs circular), and how well do those align with those of experimental physicists?

Session Classification: Accelerator technologies and challenges

Contribution ID: **9** Type: **not specified**

Discussion Session

Friday 4 November 2022 12:00 (20 minutes)

- We do not want to discuss details of current technology issues.
- How to attract and sustain the careers of R&D experts?
- Do current available infrastructures (test beams, large scale generic prototyping and irradiation) meet the needs of next generation experiments?
- Could collaboration between academic and industrial partners help increase R&D fundings in the UK? Should this be pursued?
- Timeline for when FCCee/hh baseline detector concepts to be finalised? Wait for feedback from HL-LHC detector upgrades might be too late?
- With the current personpower, how many detector concepts can be developed?

Session Classification: Detector technologies and challenges

Contribution ID: **10** Type: **not specified**

Discussion Session

Friday 4 November 2022 13:45 (20 minutes)

- What will be the greatest challenge in the development of theoretical calculations, modelling, PDFs ⋯?
- How to best foster collaborations between theorists and experimentalists for future collider studies? Where should the focus be put?
- What feedback is needed to tune the accelerator design and running mode to optimise the physics case?
- Is there any specific area that is currently un(der)covered?

Session Classification: Theoretical perspectives and challenges

Contribution ID: **11** Type: **not specified**

Discussion Session

Friday 4 November 2022 14:30 (20 minutes)

- How to best recognise and value the effort of the developers community of state-of-the-art R&D-specific software packages, which must be maintained and continuously updated?
- What technology advances are critical to build the needed computing facilities to enable the FCCee programme? Are there any bottlenecks in the development of common tools and software infrastructure?
- What is the status of full simulation and reconstruction software? It is now a crucial aspect to build the physics case. Is it better to prioritise SW stability and robustness or early availability?
- How to best engage the young UK community?
- What is the plan for the exponential cost of computing hardware (and current foreseen chip procurement challenges)?
- Will ML play an important role in the core simulation and trigger software at FCC?

Session Classification: Software+ computing: challenges and opportunities

Contribution ID: **12** Type: **not specified**

Welcome

Friday 4 November 2022 10:00 (5 minutes)

Presenter: PARKER, Andy (University of Cambridge (GB))

Session Classification: Welcome/introduction

Contribution ID: **13** Type: **not specified**

Introduction and practical details

Friday 4 November 2022 10:05 (5 minutes)

Presenter: WILLIAMS, Sarah Louise (University of Cambridge (GB))

Session Classification: Welcome/introduction

Contribution ID: **14** Type: **not specified**

Suggested points for discussion

Friday 4 November 2022 15:00 (20 minutes)

- From a technology readiness perspective, what is your impression on what extent could a detector for ILC, FCC-ee, FCC-hh could be build "tomorrow"if the accelerators were spontaneously delivered?
- If all existing "anomalies"(e.g. lepton universality in B decays, W mass, muon g-2) were resolved by measurements / theory developments, is there still a compelling case for a new collider beyond the HL-LHC? -Is there a case to skip a future lepton collider if a machine like FCC-hh could be built significantly earlier (e.g. by 20 years)?
- Do you agree with the current baseline strategy (2020 European Strategy document) i.e. focus should be a "e+e- Higgs factory"
- Is the vision for a ˜100km accelerator environmentally responsible?
- Can a case for public funding of a new accelerator be made against a backdrop of the challenges brought by a war in europe, a cost of living / energy crisis and accelerating climate change?
- If the funding case for the LHC had to be made today, would it have been built? -Is there an optimal way for today's ECRs to begin to invest some of their time to contribute to the realisation of a future collider, while making significant contributions to the LHC programme? Please select someone in your group to summarise your discussions when we come together after the coffee break

Session Classification: Breakout discussions: ECR views on future collider prospects