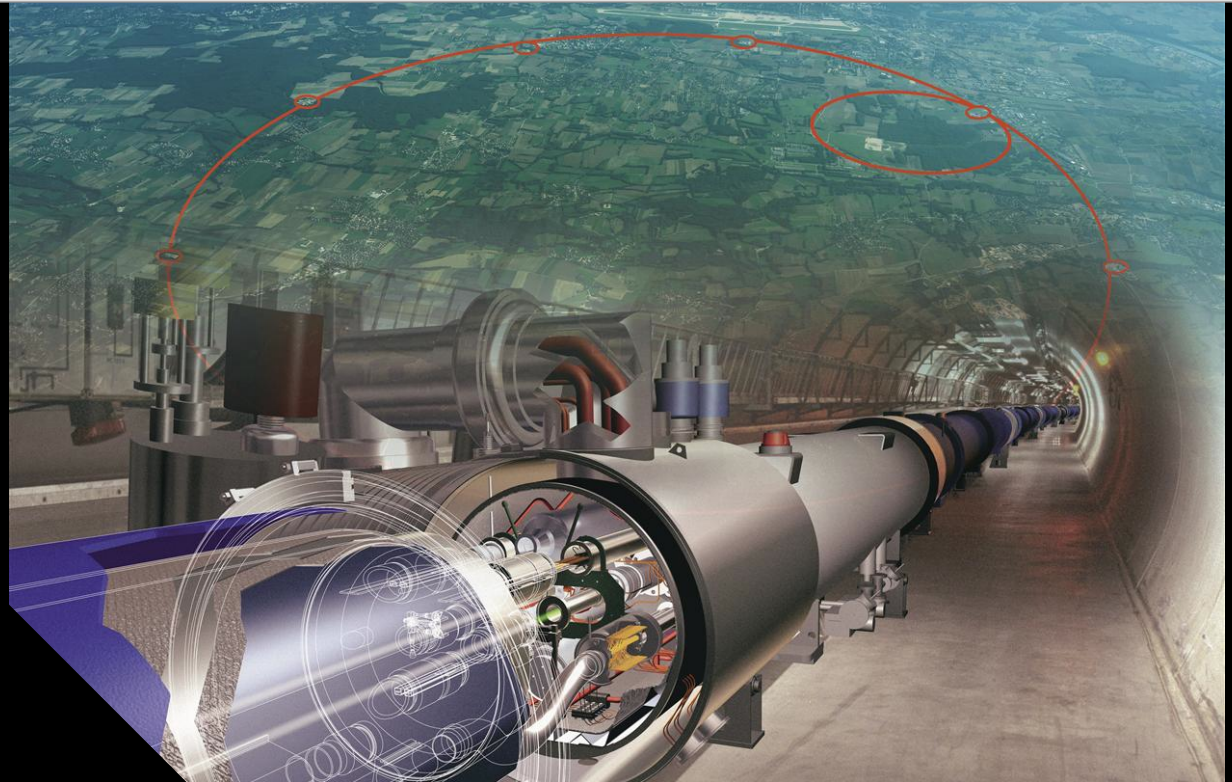


ECFA & the update of the European Strategy for Particle Physics

*Jorgen D'Hondt
Vrije Universiteit Brussel
ECFA chair*

*FCC France
14-15 May 2020*



fwo

HEP@VUB
BRUSSELS

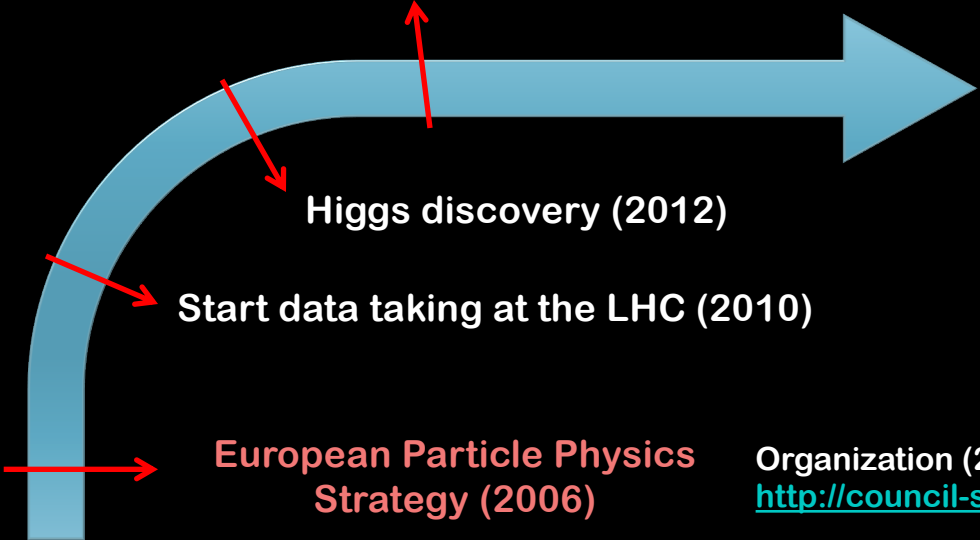
VUB *iihe*
BRUXELLES BRUSSEL

Long-term strategy for Particle Physics



Organization (2013 update):
<http://europeanstrategygroup.web.cern.ch/europeanstrategygroup/>

UPDATE of the European Particle Physics Strategy (2013)



Higgs discovery (2012)

Start data taking at the LHC (2010)

European Particle Physics Strategy (2006)

TODAY

Start data taking HL-LHC (≥ 2027)

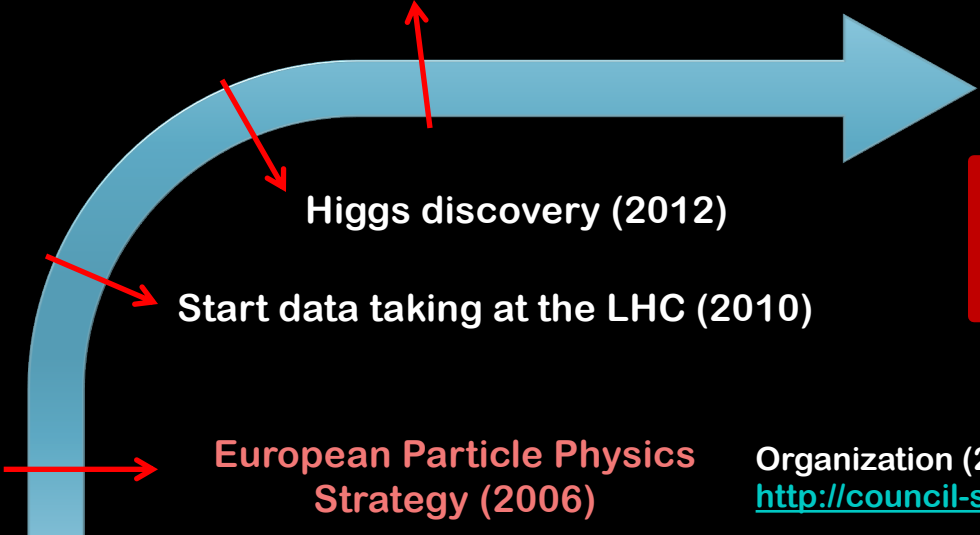
Organization (2006):
<http://council-strategygroup.web.cern.ch/council-strategygroup/>

Long-term strategy for Particle Physics



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UPDATE of the European Particle Physics Strategy (2013)



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TODAY

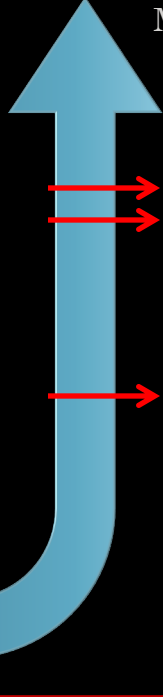
UPDATE of the European Particle Physics Strategy (2020)

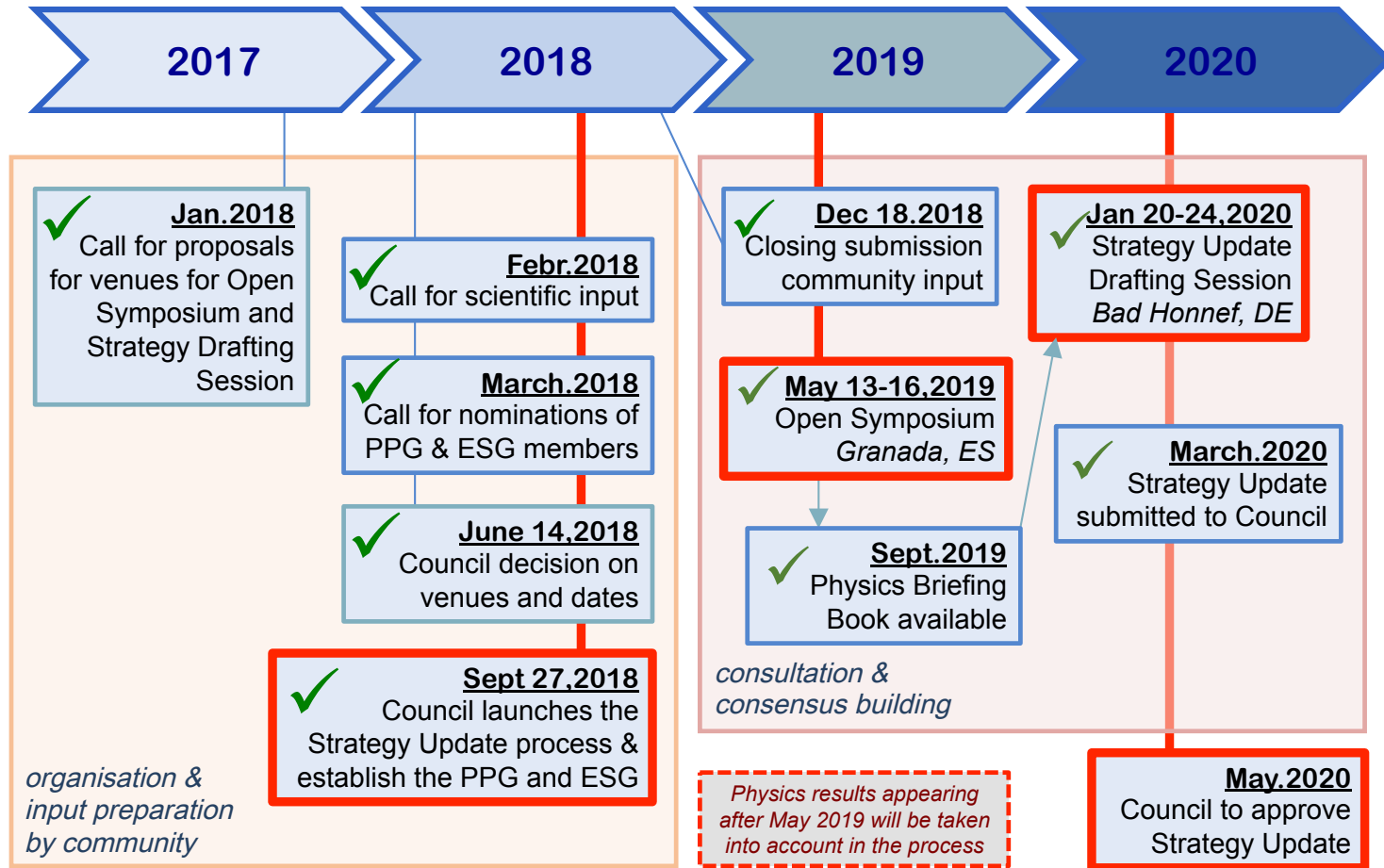
<https://europeanstrategy.cern>

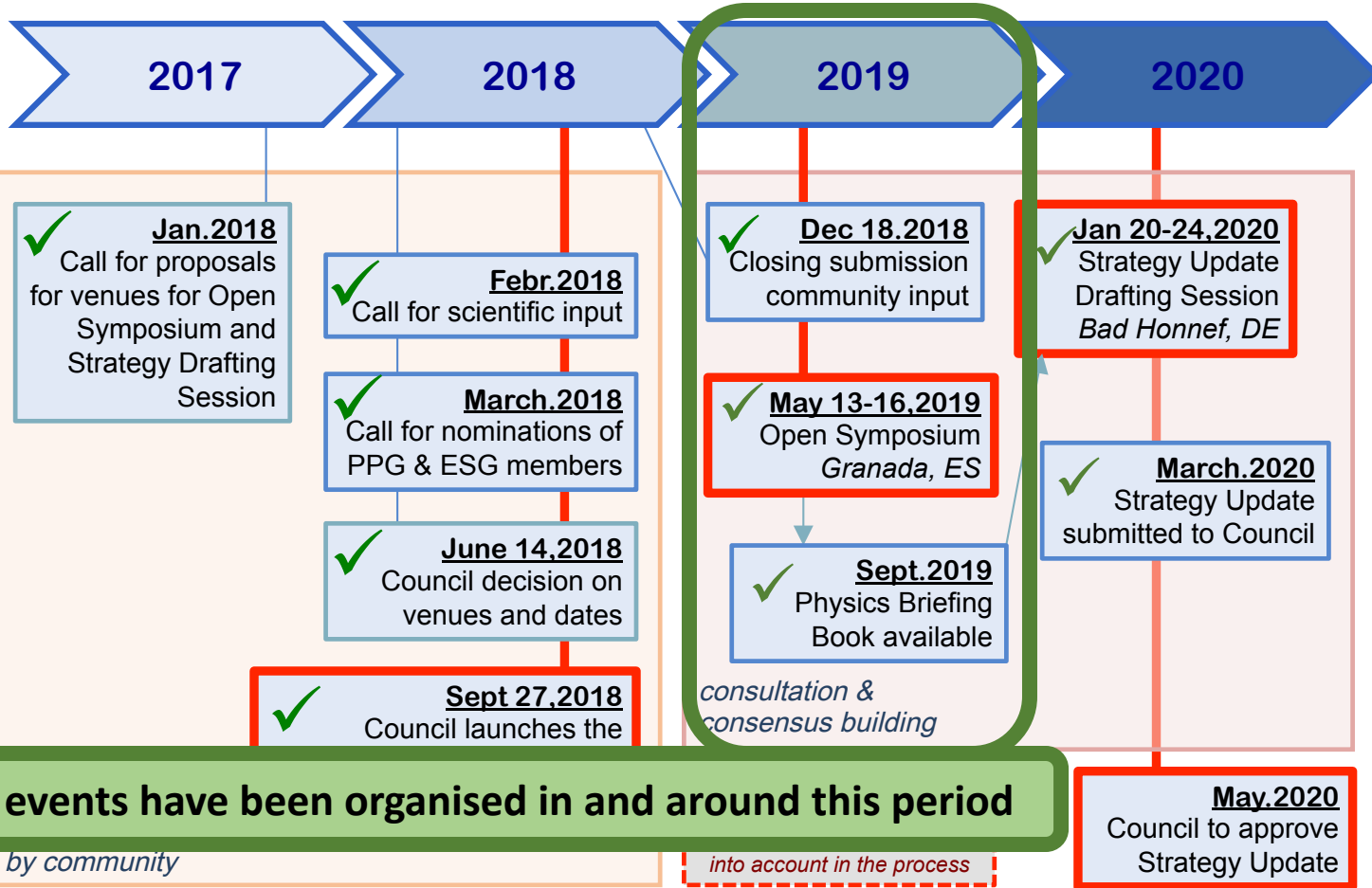
Organization (2006):
<http://council-strategygroup.web.cern.ch/council-strategygroup/>

Major facility after HL-LHC

Start data taking HL-LHC (≥ 2027)







**European Committee for Future Accelerators (ECFA) - <https://ecfa.web.cern.ch>
representing the European research community in particle physics
ECFA efforts related to the European Strategy**

- **Engaged four ECFA nominated members of the PPG**
(e.g. organization of the Open Symposium, Physics Briefing Book, ...)
- **Setting up a working group on Higgs@FutureColliders** (<https://arxiv.org/abs/1905.03764>)
- **Organizing a first study and debate on recognition of individuals in large collaborations**
(<https://indico.cern.ch/event/759130/contributions/3148323/attachments/1753311/2874608/ECFA-Survey-Recognition-Results.pdf>)
- **Organizing a study on Detector R&D in our community**
(https://ecfa.web.cern.ch/sites/ecfa.web.cern.ch/files/ECFA_detector_panel_ESPPU_input_Dec2018.pdf)
(https://indico.cern.ch/event/788120/contributions/3344767/attachments/1812392/2960585/Cattai_v4.pdf)
- **Organizing a first Joint Seminar with Astroparticle and Nuclear physics** (<https://jenas-2019.lal.in2p3.fr>)
- **Setup of an APPEC-ECFA-NuPECC Diversity Charter** (<https://ecfa.web.cern.ch/content/diversity-charter>)
- **Open ECFA session on Future Colliders** (ECFA Newsletter #2 via <https://ecfa.web.cern.ch>)
- **Open joint session ECFA and EPS-HEPP on Strategy** (ECFA Newsletter #3 via <https://ecfa.web.cern.ch>)
- **Open ECFA session on Advanced Accelerator Technologies** (ECFA Newsletter #4 via <https://ecfa.web.cern.ch>)
- **Organizing a first debate among Early Career Researchers** (<https://arxiv.org/abs/2002.02837>)
- **ECFA chair member of the Strategy Secretariat** (e.g. collider scenarios @ CERN, global dissemination of strategy discussions)



Open Symposium

Towards updating the European Strategy for Particle Physics

May 13-16, 2019, Granada, Spain

<https://cafpe.ugr.es/epps2019/>

~600 participants

Information captured in 8 thematic summary talks

Joint session ECFA and EPS-HEPP

“Towards an update of the European Particle Physics Strategy”

Agenda, 13 July 2019 – <https://indico.cern.ch/event/845382/>

- 1) Overview of the ESPP Open Symposium – *Halina Abramowicz*
- 2) Technology path towards future colliders – *Caterina Biscari*
- 3) Community challenges and opportunities for detector R&D – *Ariella Cattai*
- 4) Higgs at Future Colliders – *Christophe Grojean*
- 5) Physics Beyond Colliders – *Claude Vallee*
- 6) Synergies between astroparticle, particle and nuclear physics – *Caterina Doglioni*
- 7) Computing and Software challenges – *Graeme Stewart*

ECFA Newsletter #3, 16 pages: <https://cds.cern.ch/record/2688156/files/ECFA-Newsletter-3-Summer2019-final.pdf>

Physics Briefing Book

Physics Preparatory Group

- Overviewing the submitted input and the discussions in Granada
- Excluding references etc. about 200 pages
- The work of many!
- <http://cds.cern.ch/record/2691414>

Physics Briefing Book



Input for the European Strategy for Particle Physics Update 2020

- Electroweak Physics:** Richard Keith Ellis¹, Beate Heinemann^{2,3} (Conveners)
 Jorge de Blas^{4,5}, Maria Cepeda⁶, Christophe Grojean^{7,8}, Fabio Maltoni⁹, Alejandro Nisati¹⁰,
 Elisabeth Petit¹¹, Riccardo Rattazzi¹², Wouter Verkerke¹³ (Contributors)
- Strong Interactions:** Jorgen D'Hondt¹⁴, Krzysztof Redlich¹⁵ (Conveners)
 Anton Andronic¹⁶, Ferenc Sikler¹⁷ (Scientific Secretaries)
 Nestor Armesto¹⁸, Daniel Boer¹⁹, David d'Enterria²⁰, Tetyana Galatyuk²¹, Thomas Gehrmann²²,
 Klaus Kirch²³, Uta Klein²⁴, Jean-Philippe Lansberg²⁵, Gavin P. Salam²⁶, Gunar Schnell²⁷,
 Johanna Stachel²⁸, Tanguy Pierog²⁹, Hartmut Wittig³⁰, Urs Wiedemann²⁰ (Contributors)
- Flavour Physics:** Belen Gavela³¹, Antonio Zoccolì³² (Conveners)
 Sandra Malvezzi³³, Ana Teixeira³⁴, Jure Zupan³⁵ (Scientific Secretaries)
 Daniel Aloni³⁶, Augusto Ceccucci²⁰, Avital Dery³⁶, Michael Dine³⁷, Svetlana Fajfer³⁸, Stefania Gori³⁷,
 Gudrun Hiller³⁹, Gino Isidori²², Yoshikata Kuno⁴⁰, Alberto Lusiani⁴¹, Yosef Nir³⁶,
 Marie-Helene Schune⁴², Marco Sozzi⁴³, Stephan Paul⁴⁴, Carlos Pena³¹ (Contributors)
- Neutrino Physics & Cosmic Messengers:** Stan Bentvelsen⁴⁵, Marco Zito^{46,47} (Conveners)
 Albert De Roeck²⁰, Thomas Schwetz²⁰ (Scientific Secretaries)
 Bonnie Fleming⁴⁸, Francis Halzen⁴⁹, Andreas Haungs²⁰, Marek Kowalski², Susanne Mertens⁴⁴,
 Mauro Mezzetto⁵, Silvia Pascoli⁵⁰, Bangalore Sathyaprakash⁵¹, Nicola Serra²² (Contributors)
- Beyond the Standard Model:** Gian F. Giudice²⁰, Paris Sphicas^{20,52} (Conveners)
 Juan Alcaraz Maestre⁶, Caterina Dogliani⁵³, Gaia Lanfranchi^{20,54}, Monica D'Onofrio²⁴,
 Matthew McCullough²⁰, Gilad Perez²⁶, Philipp Roloff²⁰, Veronica Sanz⁵⁵, Andreas Weiler⁴⁴,
 Andrea Wulzer^{4,12,20} (Contributors)
- Dark Matter and Dark Sector:** Shoji Asai⁵⁶, Marcela Carena⁵⁷ (Conveners)
 Babette Döbrich²⁰, Caterina Dogliani⁵³, Joerg Jaeckel²⁸, Gordana Krnjaic⁵⁷, Jocelyn Monroe⁵⁸,
 Konstantinos Petridis⁵⁹, Christoph Weniger⁶⁰ (Scientific Secretaries)
- Accelerator Science and Technology:** Caterina Biscari⁶¹, Leonid Rivkin⁶² (Conveners)
 Philip Burrows²⁰, Frank Zimmermann²⁰ (Scientific Secretaries)
 Michael Benedikt²⁰, Edda Gschwendtner²⁰, Erk Jensen²⁰, Mike Lamont²⁰, Wim Leemans²,
 Lucio Rossi²⁰, Daniel Schulte²⁰, Mike Seide⁶², Vladimir Shiltsev⁶³, Steinar Stapnes²⁰,
 Akira Yamamoto^{20,64} (Contributors)
- Instrumentation and Computing:** Xinchou Lou⁶⁵, Brigitte Vachon⁶⁶ (Conveners)
 Roger Jones⁶⁷, Emilia Leogrande²⁰ (Scientific Secretaries)
 Ian Bird²⁰, Amber Boehnlein⁶⁸, Simone Campana²⁰, Ariella Cattai²⁰, Didier Contardo⁶⁹,
 Cinzia Da Via⁷⁰, Francesco Forti⁷¹, Maria Gironce²⁰, Matthias Kasemann², Weidon Li⁶⁵,
 Lucie Linsen²⁰, Felix Sefkow², Graeme Stewart²⁰ (Contributors)
- Editors:** Halina Abramowicz⁷², Roger Forty²⁰, and the Conveners

Higgs@FutureColliders report

- exploring the Higgs sector remains a key ambition
- ECFA initiated a dedicated WG on the topic
- an assessment of the potential of future colliding beam facilities to perform Higgs boson studies
- the analysis builds on the submissions made by the proponents of future colliders to the European Strategy Update process, and takes as its point of departure the results expected at the completion of the HL-LHC program
- <https://arxiv.org/abs/1905.03764>

“Higgs Boson studies at future particle colliders”, JHEP01 (2020) 139

Higgs Boson studies at future particle colliders

J. de Blas,^{a,b} M. Cepeda,^c J. D'Hondt,^d R.K. Ellis,^e C. Grojean,^{f,g} B. Heinemann,^{f,h} F. Maltoni,^{i,j} A. Nisati,^k E. Petit,^l R. Rattazzi^m and W. Verkerkeⁿ

^aDipartimento di Fisica e Astronomia Galileo Galilei, Università di Padova, Via Marzolo 8, I-35131 Padova, Italy

^bINFN — Sezione di Padova, Via Marzolo 8, I-35131 Padova, Italy

^cCentro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), Avda. Complutense 40, 28040, Madrid, Spain

^dInter-University Institute for High Energies (IHHE), Vrije Universiteit Brussel, Brussels, 1050, Belgium

^eIPPP, University of Durham, Durham DH1 3LE, U.K.

^fDeutsches Elektronen-Synchrotron (DESY), Hamburg, 22607, Germany

^gInstitut für Physik, Humboldt-Universität, Berlin, 12489, Germany

^hAlbert-Ludwigs-Universität Freiburg, Freiburg, 79104, Germany

ⁱCentre for Cosmology, Particle Physics and Phenomenology, Université catholique de Louvain, Louvain-la-Neuve, 1348, Belgium

^jDipartimento di Fisica e Astronomia, Università di Bologna and INFN — Sezione di Bologna, via Irnerio 46, 40126 Bologna, Italy

^kINFN — Sezione di Roma, P.le A. Moro 2, I-00185 Roma, Italy

^lAix Marseille Univ, CNRS/IN2P3, CPPM, Marseille, France

^mTheoretical Particle Physics Laboratory (LPTP), EPFL, Lausanne, Switzerland

ⁿNikhef and University of Amsterdam, Science Park 105, 1098XG Amsterdam, the Netherlands

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christophe.grojean@desy.de, beate.heinemann@desy.de,

fabio.maltoni@uclouvain.be, nisati@cern.ch, Elisabeth.Petit@cern.ch,

riccardo.rattazzi@epfl.ch, verkerke@nikhef.nl

ABSTRACT: This document aims to provide an assessment of the potential of future colliding beam facilities to perform Higgs boson studies. The analysis builds on the submissions made by the proponents of future colliders to the European Strategy Update process, and takes as its point of departure the results expected at the completion of the HL-LHC program. This report presents quantitative results on many aspects of Higgs physics for future collider projects of sufficient maturity using uniform methodologies.

KEYWORDS: e+e- Experiments, Electroweak interaction, Higgs physics

ARXIV EPRINT: [1905.03764](https://arxiv.org/abs/1905.03764)

ApPEC-ECFA-NuPECC – Joint Seminar

(<https://jenas-2019.lal.in2p3.fr>)

- First ever joint seminar across three disciplines, i.e. astroparticle, particle and nuclear physics
- ~230 registrations, incl. many early-career researchers
- Opportunity to identify and explore synergies
- Overall a very successful event, cfr. results of the post-evaluation survey among participants shows that above 98% found the meeting useful
- Consensus to organize a JENAS event every 2 years

JENAS-2019

Joint ECFA-NuPECC-ApPEC Seminar
jointly organized by LAL, IPNO, IRFU and LPNHE

October 14-16, 2019

Auditorium Pierre Lehmann, bât. 200, Faculté d'Orsay

ECFA-NuPECC-ApPEC Organizing Board

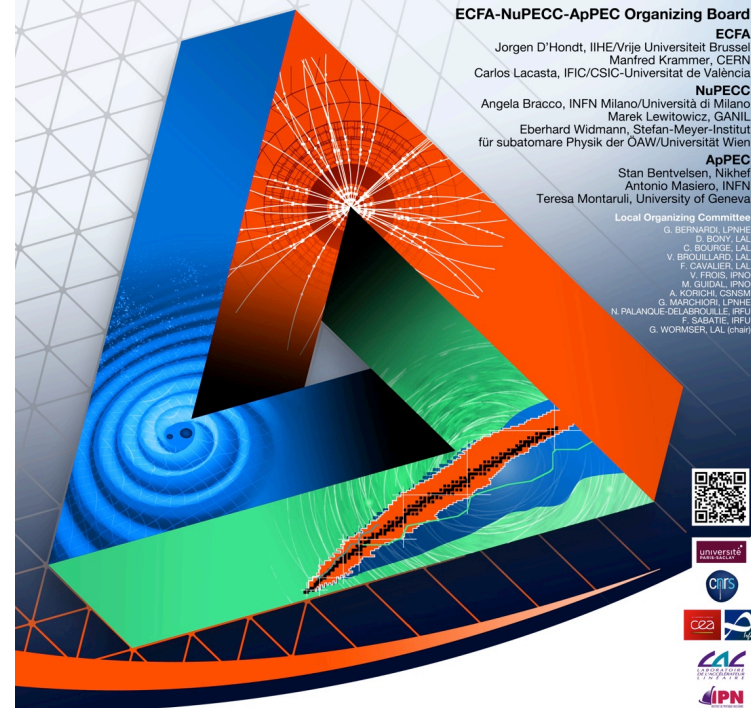
ECFA
Jorgen D'Hondt, IIHE/Vrije Universiteit Brussel
Manfred Kramer, CERN
Carlos Lacasta, IFIC/CSIC-Universitat de València

NuPECC
Angela Bracco, INFN Milano/Università di Milano
Marek Lewitowicz, GANIL
Eberhard Widmann, Stefan-Meyer-Institut
für subatomare Physik der OAW/Universität Wien

ApPEC
Stan Bentvelsen, Nikhef
Antonio Masiero, INFN
Teresa Montaruli, University of Geneva

Local Organizing Committee

G. BERNARDI, LPNHE
D. BOHY, LAL
C. BOURGIE, LAL
V. BROUILLARD, LAL
F. CAVALIERI, LAL
V. FROIS, IPNO
M. GUDAL, IPNO
A. KORICH, CSNSM
G. MARCIORI, LPNHE
N. PALANQUE-DELABROUILLE, IRFU
F. SABATIE, IRFU
G. WORSER, LAL (chair)





Additional open events organized by ECFA

Open ECFA session, 15-16 Nov 2018, <https://indico.cern.ch/event/759130/>

Overview of all **future collider projects** inside and outside Europe

ECFA Newsletter #2, 24 pages: <https://ecfa.web.cern.ch/sites/ecfa.web.cern.ch/files/ECFA-Newsletter-2-Winter2018-final.pdf>

Video-recordings via: <https://indico.cern.ch/event/759130/contributions/>

Joint ECFA-EPS session during the EPS-HEPP conference, July 2019, <https://indico.cern.ch/event/845382/>

ECFA Newsletter #3, 16 pages: <https://cds.cern.ch/record/2688156/files/ECFA-Newsletter-3-Summer2019-final.pdf>

Open ECFA session, 14-15 Nov 2019, <https://indico.cern.ch/event/847002/overview>

Advanced Accelerator Technologies: HTS magnets, plasma, muon, ERL

ECFA Newsletter #4, 26 pages: <http://cds.cern.ch/record/2705211/files/English.pdf>

Video-recordings via: http://cdsweb.cern.ch/search?ln=en&p=105th+Plenary+ECFA+meeting++CERN&jrec=1&f=490_a

ECFA Early-Career Researchers debate on the European Strategy (~180 participants), 15 Nov 2019

Report available at <https://arxiv.org/abs/2002.02837>

ECFA Newsletters #1 - #2 - #3 - #4

available on the ECFA website:

<https://ecfa.web.cern.ch>

The e-group remains available for anybody with a CERN account (or at least a CERN lightweight account) can register.

One can do so under "Members" via the following link

<https://e-groups.cern.ch/e-groups/Egroup.do?egroupId=10319139&AI>





Report from Early-Career Researchers

<https://arxiv.org/abs/2002.02837>

- Group of 180 researchers mandated by ECFA to discuss the Strategy
- This happened after the appearance of the Briefing Book, hence this was a major input
- Nominated from ECFA countries aiming for a reasonably balanced demography
- Debated on the strategy topic on 14 Nov 2019
- Additionally, they conducted a survey among them with ~118 out of 180 participants
- Report was made public earlier 2020

- Their observations were presented to the European Strategy Group at Bad Honnef



From the executive summary of the ECR report

- *The **attractiveness of our field** is at risk and dedicated actions need to be taken to save its future. When continuing on the current path, the field will likely be unable to attract the brightest minds to particle physics.*
- *While being open for future international projects, ECRs emphasize the **importance of a European collider project soon after HL-LHC**. Postponing the choice of the next collider project at CERN to the 2030s has the potential to negatively impact the future of the field.*
- *The ECRs strongly recommend future project evaluations and strategy updates to **include the social impact of their implementation**: equal recognition and career paths for the various domains, a healthy work-life-balance and the reconciliation of family and a scientific career is a must.*
- *A strong statement from CERN putting the **environment and sustainability** at the forefront of decision-making would have a significant impact.*
- *A **strong and diverse R&D program** on accelerators and detectors must be a high priority for the future.*
- ***Software and computing activities** must be recognized not only as means to do physics analyses, but as research that requires a high level of skill.*
- *In an effort towards reducing the carbon footprint associated with travel for work purposes, our community can drive the **development of new software for remote meetings***

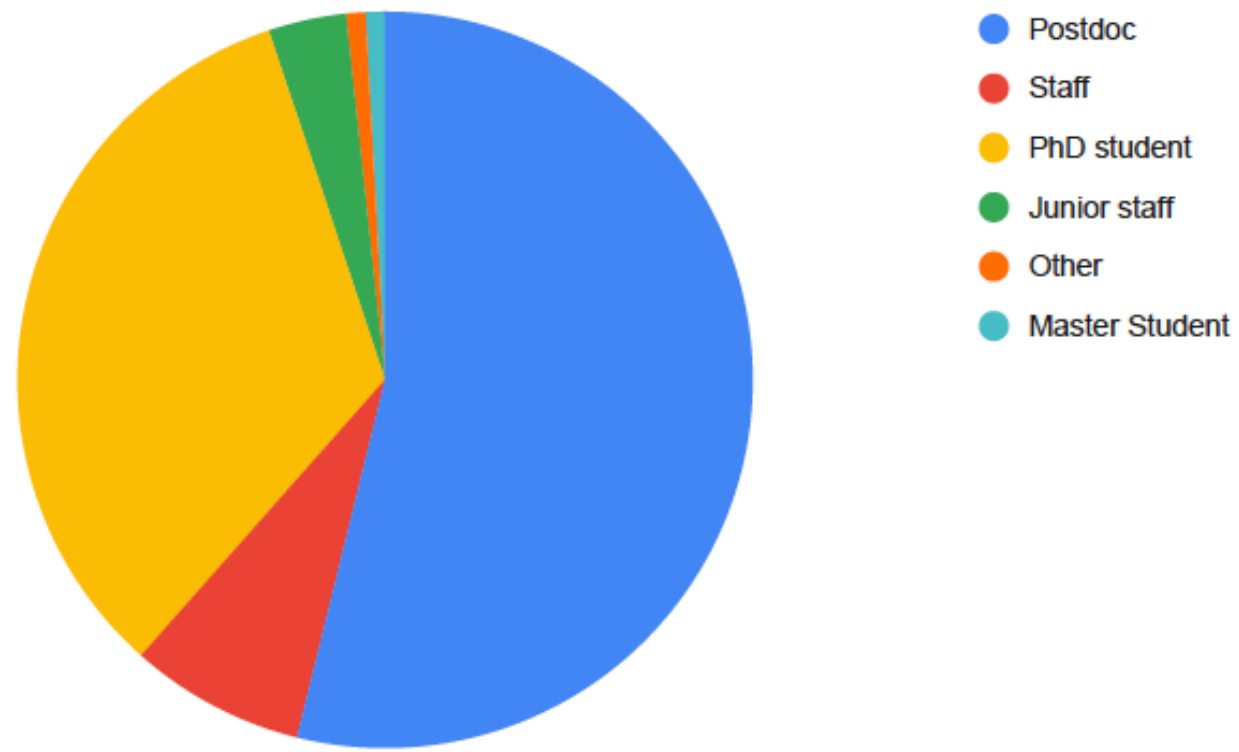


From the executive summary of the ECR report

- The **attractiveness of our field** is at risk and dedicated actions need to be taken to save its future. When continuing on the current path, the field will likely be unable to attract the brightest minds to particle physics.
- While being open for future international projects, ECRs emphasize the **importance of a new project soon after HL-LHC**. Postponing the choice of the next collision project has the potential to negatively impact the future of the field.
- The ECRs emphasize that **work-life balance** is a must. A healthy work-life balance is a must.
- **Putting the environment and sustainability** at the forefront of decision-making would have a significant impact.
- A **strong and diverse R&D program** on accelerators and detectors must be a high priority for the future.
- **Software and computing activities** must be recognized not only as means to do physics analyses, but as research that requires a high level of skill.
- In an effort towards reducing the carbon footprint associated with travel for work purposes, our community can drive the **development of new software for remote meetings**.

Taken into account in the debates at Bad Honnef
and should be considered for any major future collider project

Current career stage





Topics addressed

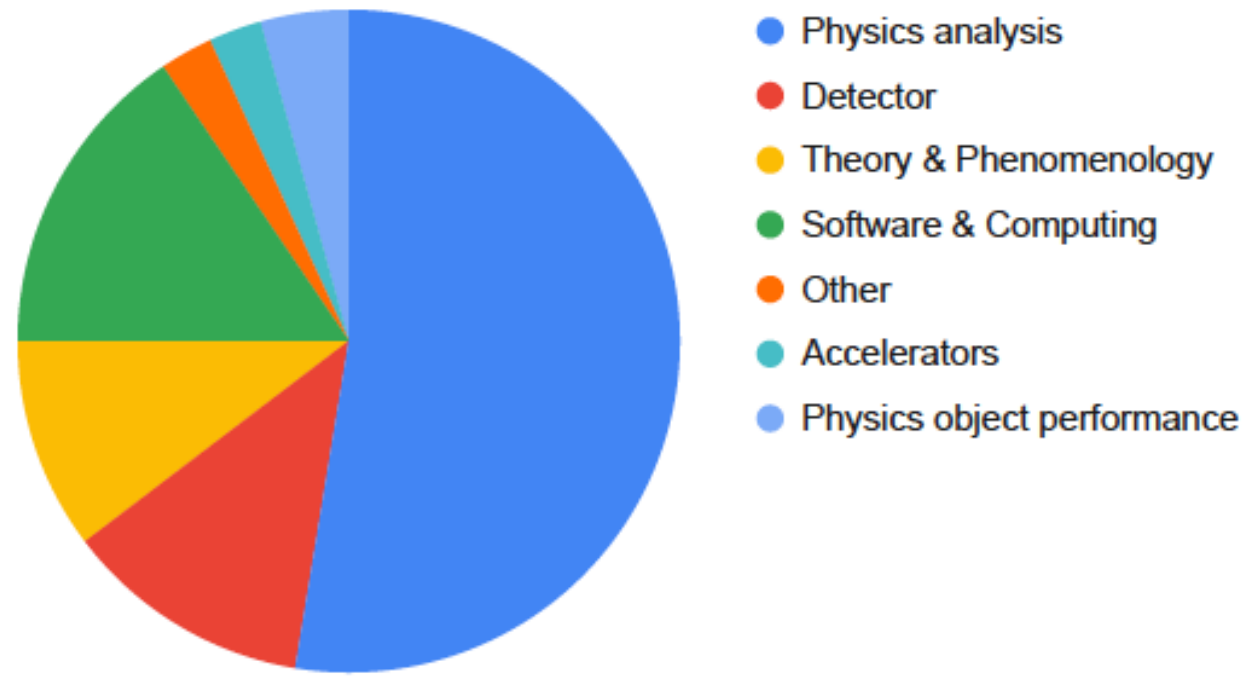
- *Sociological and human aspects*
- *Environmental and Sustainability Considerations*
- *Electroweak and Strong Interactions*
- *Beyond Standard Model, Dark Matter, and Dark Sector*
- *Flavour, Neutrino and Cosmic Messenger Physics*
- *Accelerator and Detector R&D*
- *Computing and Software*



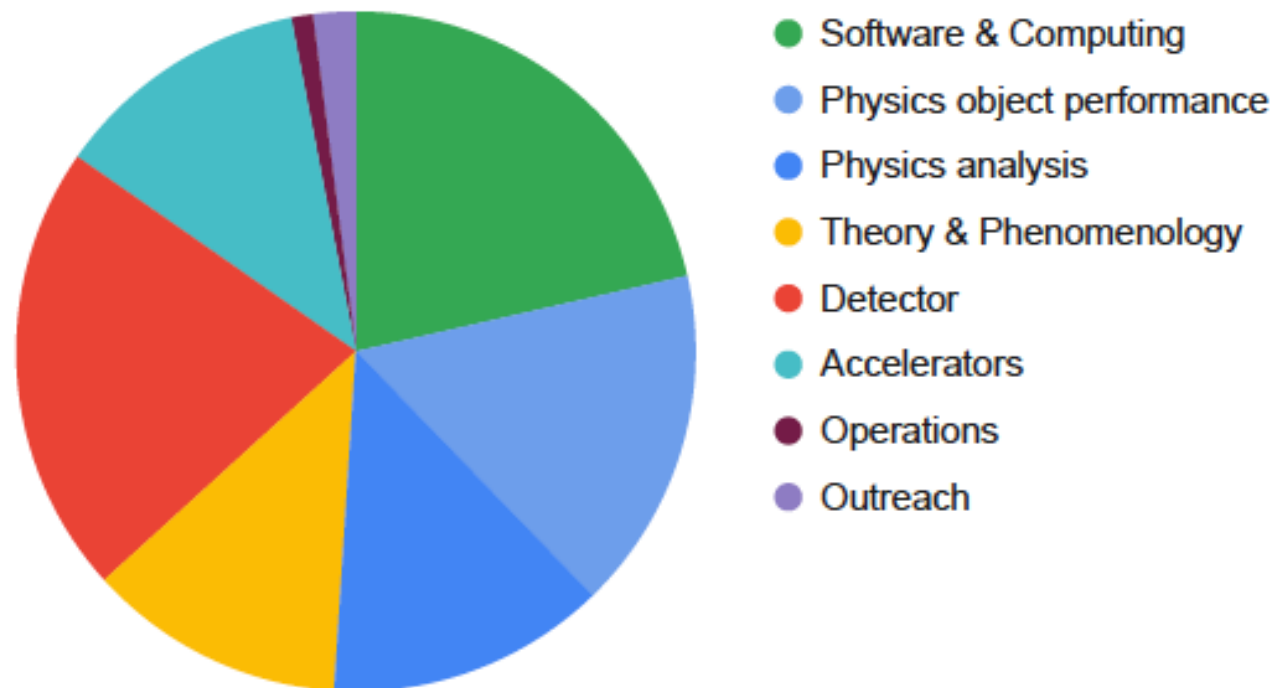
Sociological and human aspects



Which area of work is most likely to further your career?



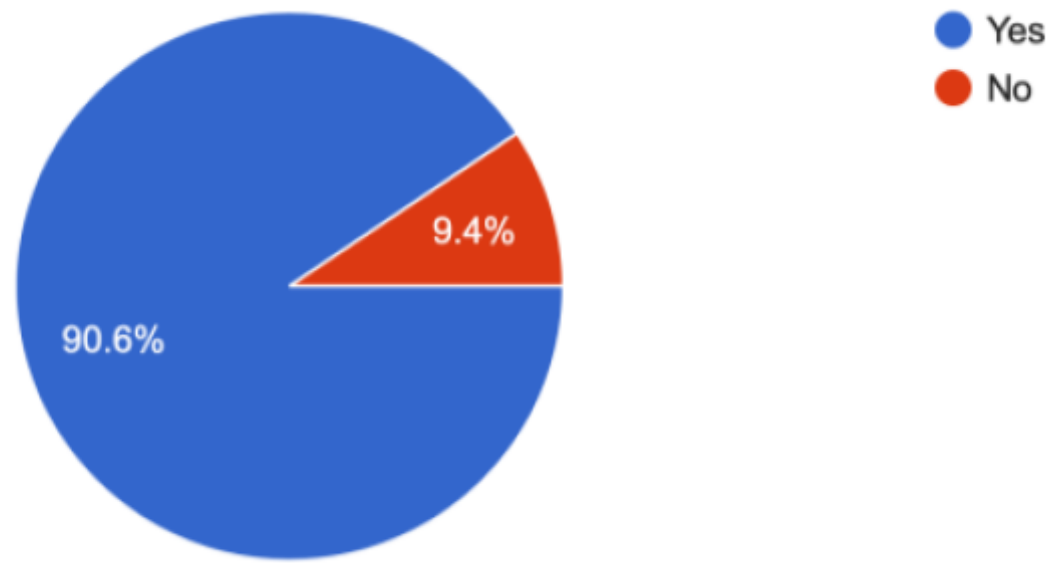
Which area of work is least likely to further your career?





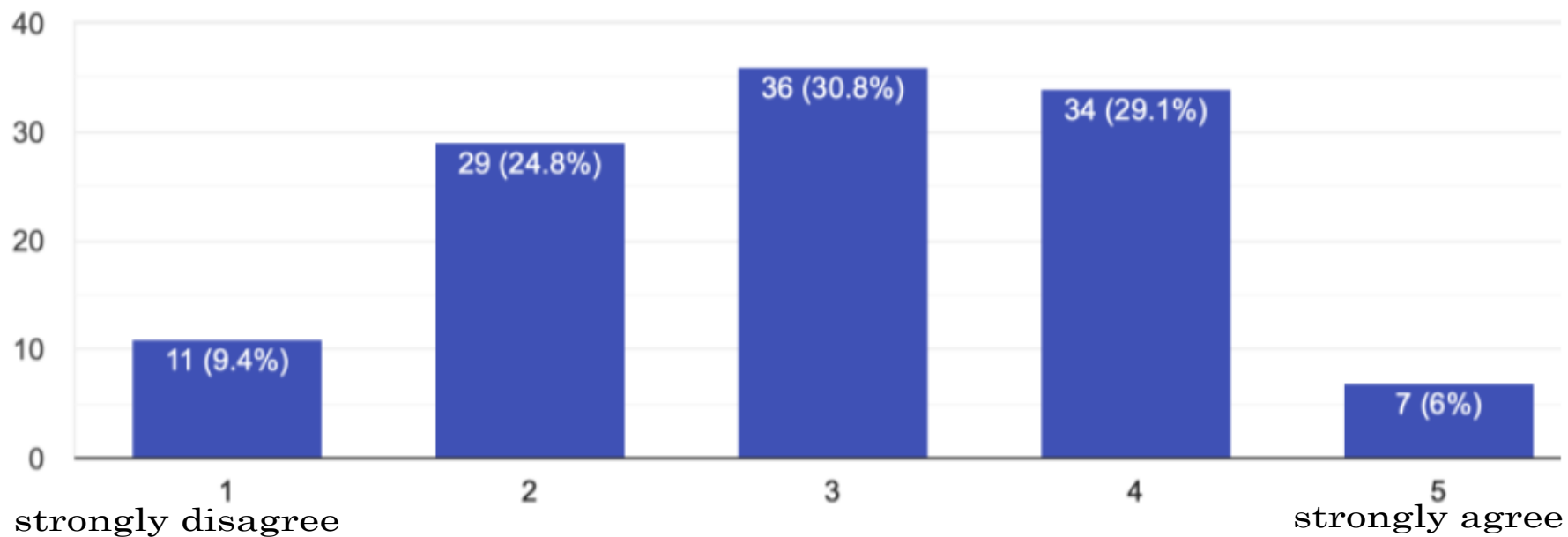
Are you interested in a long term career in research/academia?

117 responses



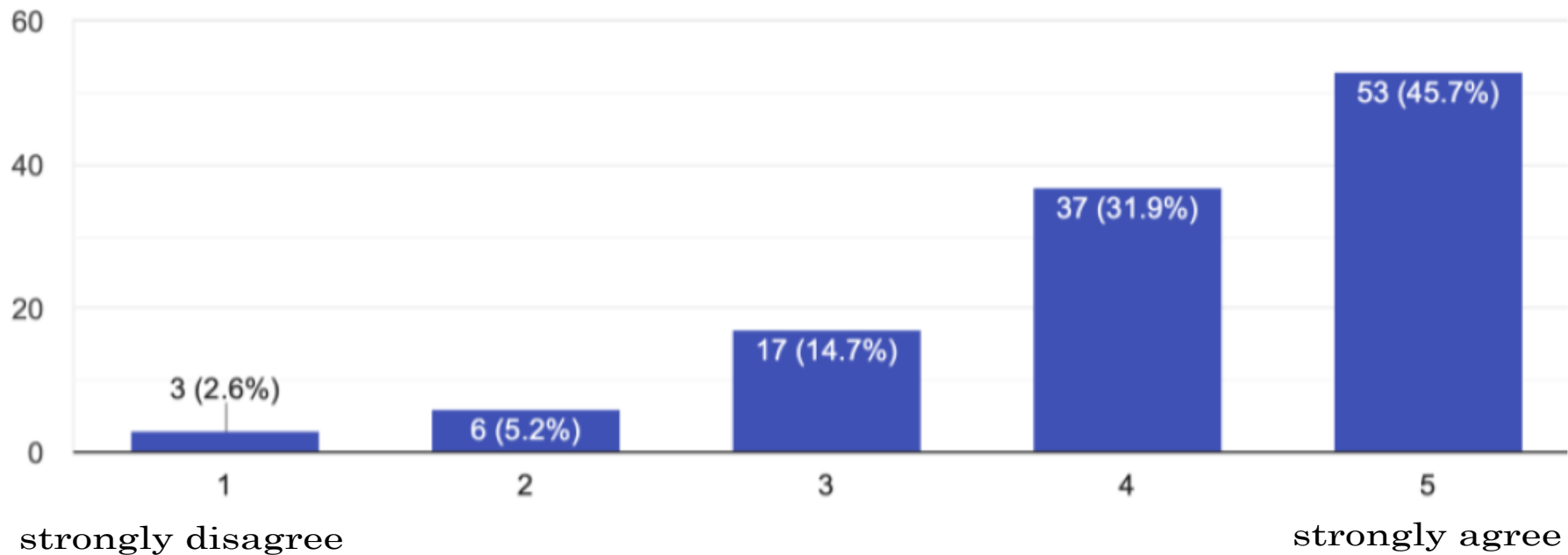
I think I have good prospects for a long term career in academia

117 responses



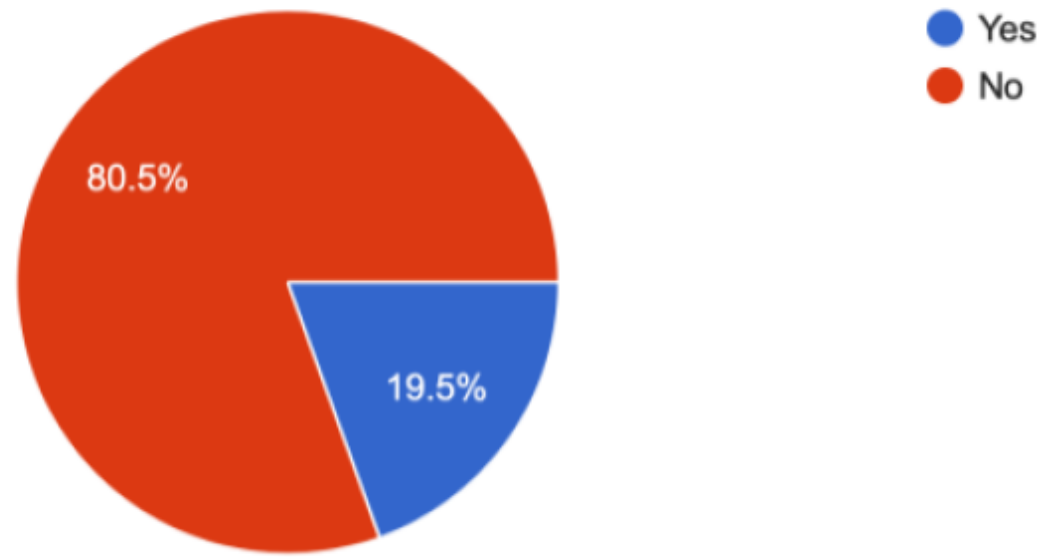
Working extra hours is necessary to secure my academic career.

116 responses



Do you have children?

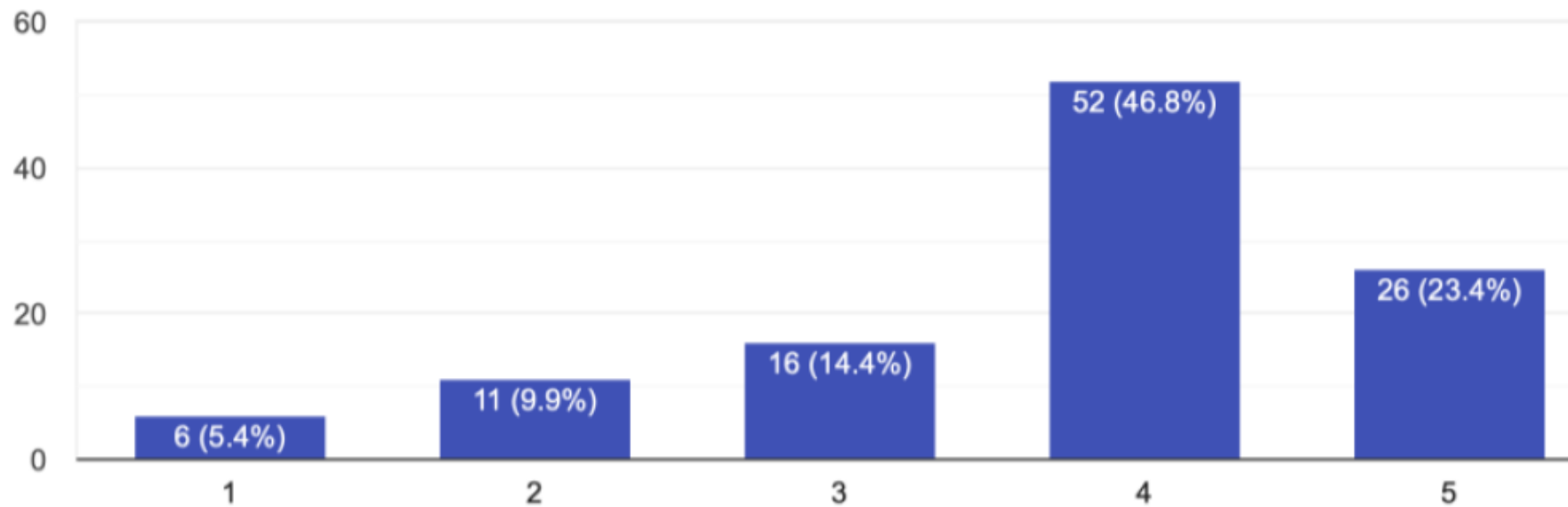
118 responses





Having children would negatively affect my academic career

111 responses



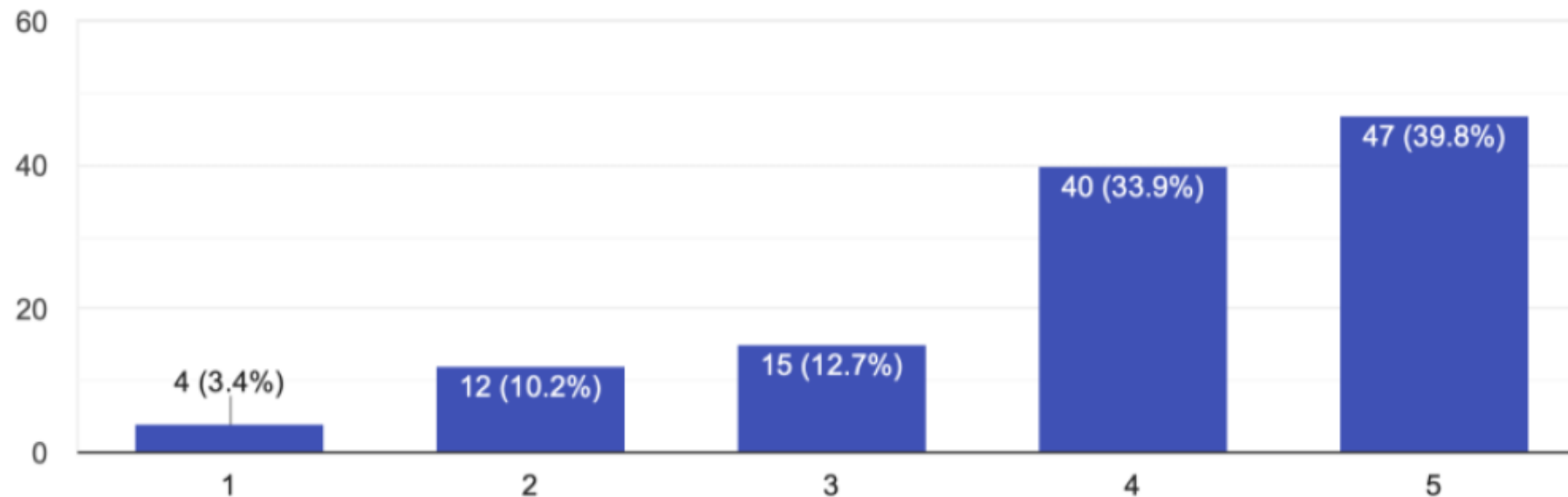


Environmental and Sustainability Considerations



How important it is for you that the environmental impact is taken into account when taking decisions on future projects?

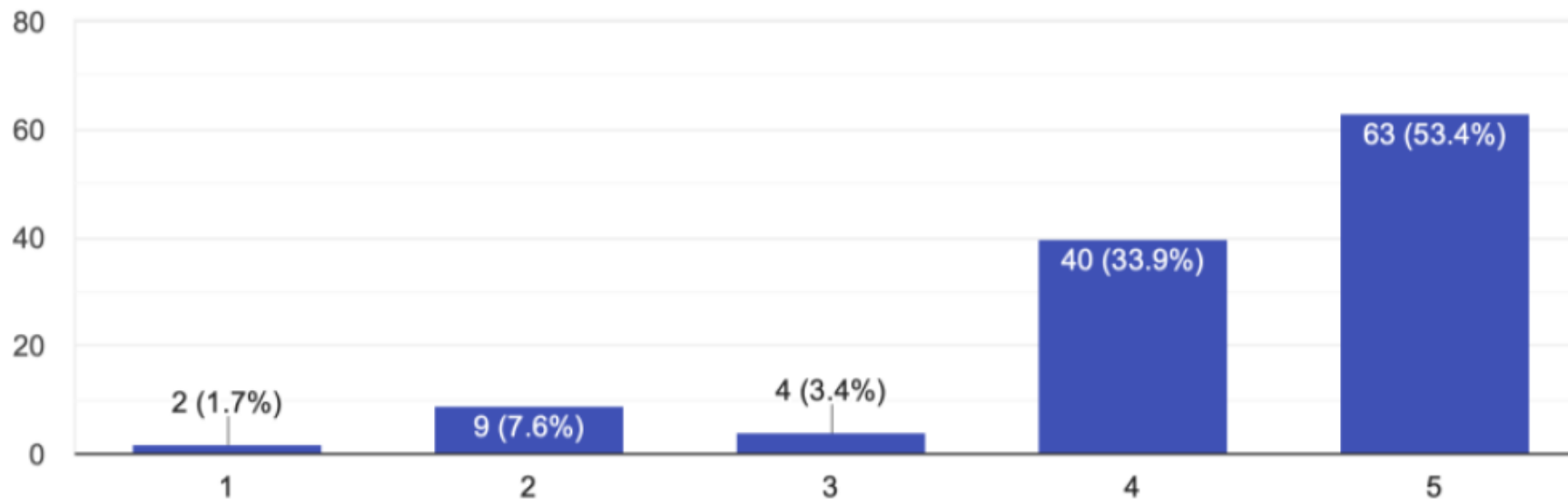
118 responses





Attending conferences and workshops in person is necessary to secure your academic career

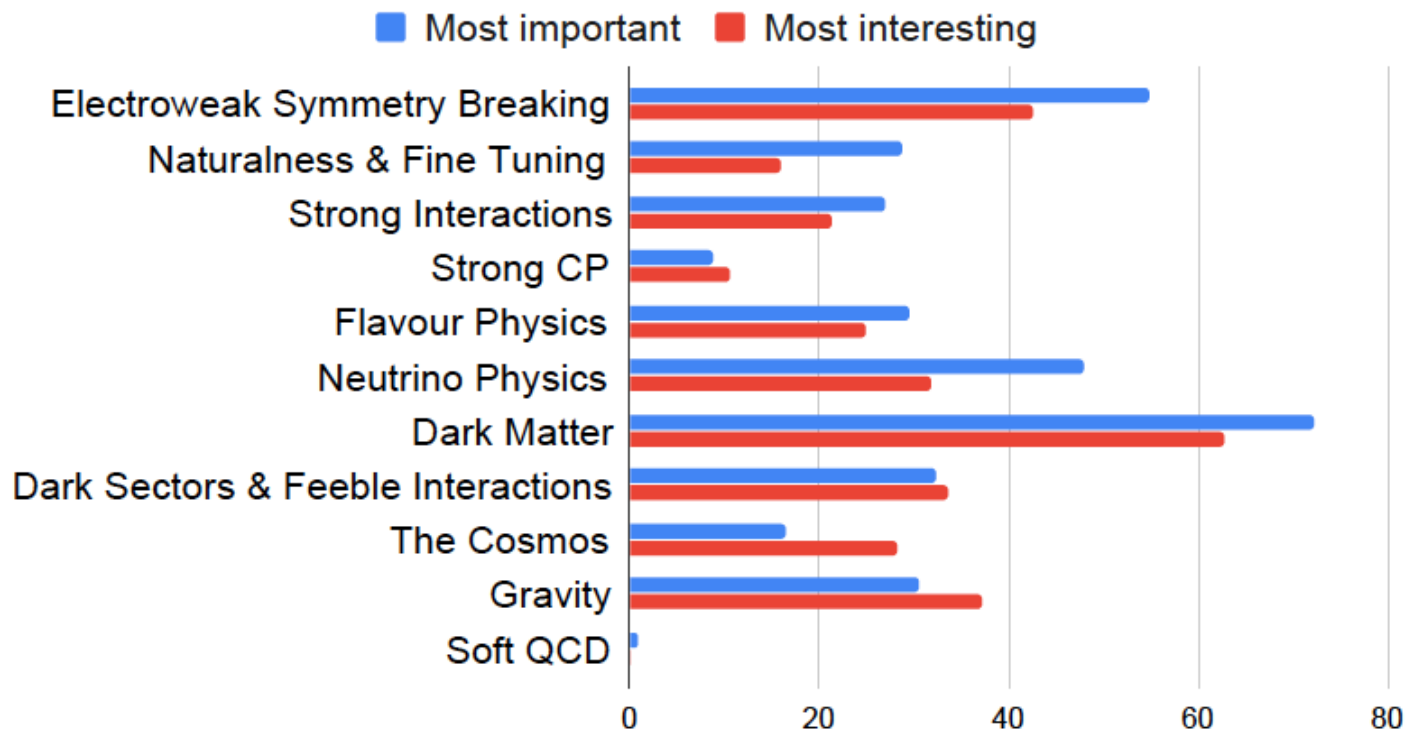
118 responses





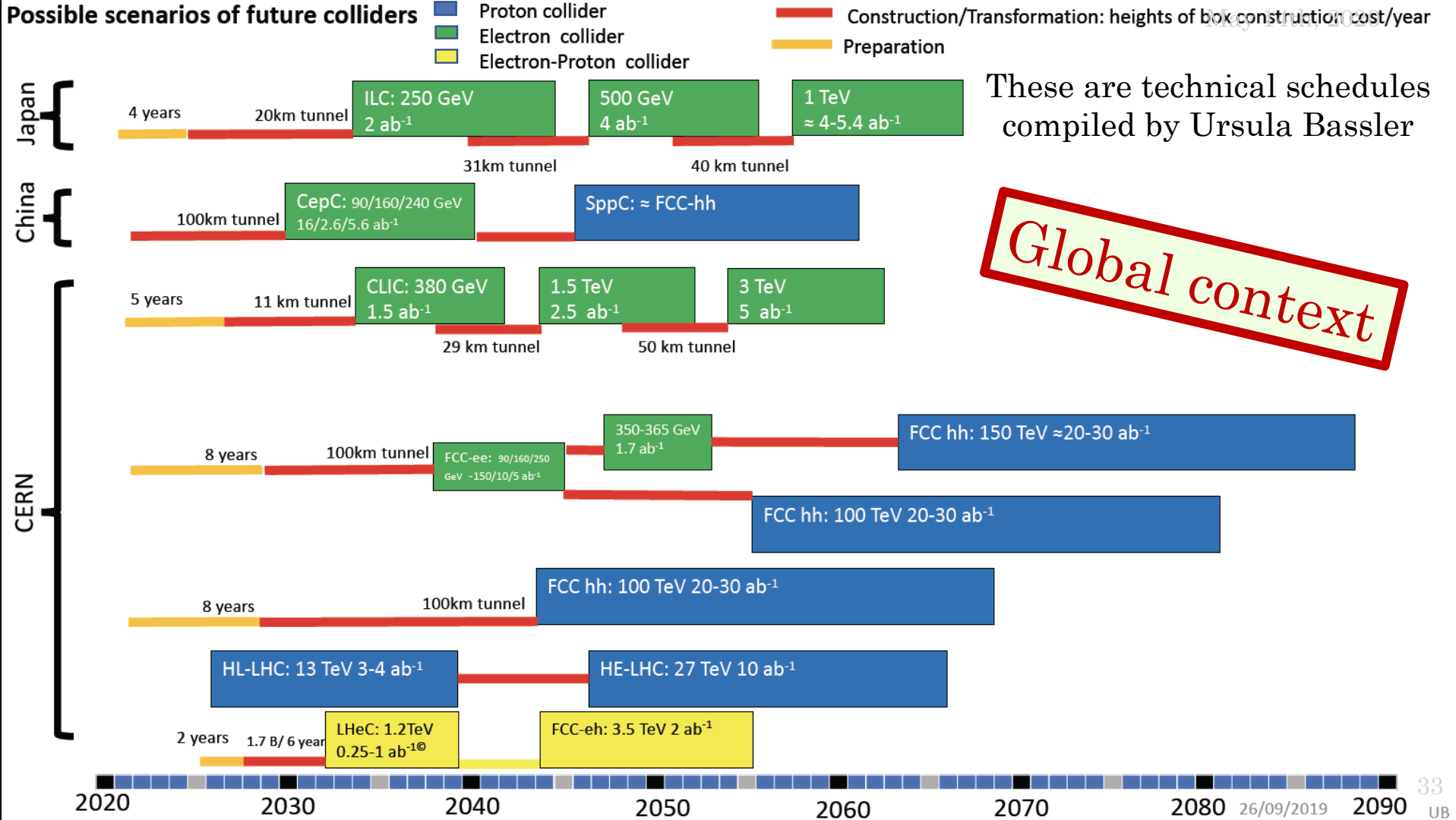
Research

Most important and most interesting topics in HEP



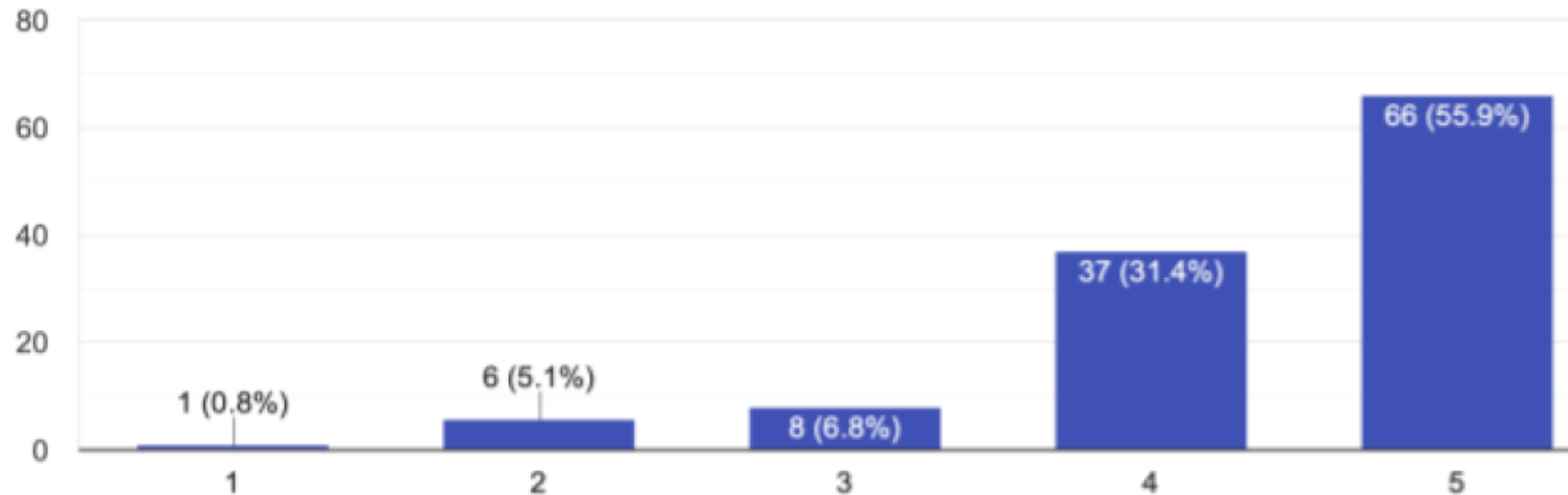


Colliders



How important is it to you that Europe will continue with a collider after HL-LHC?

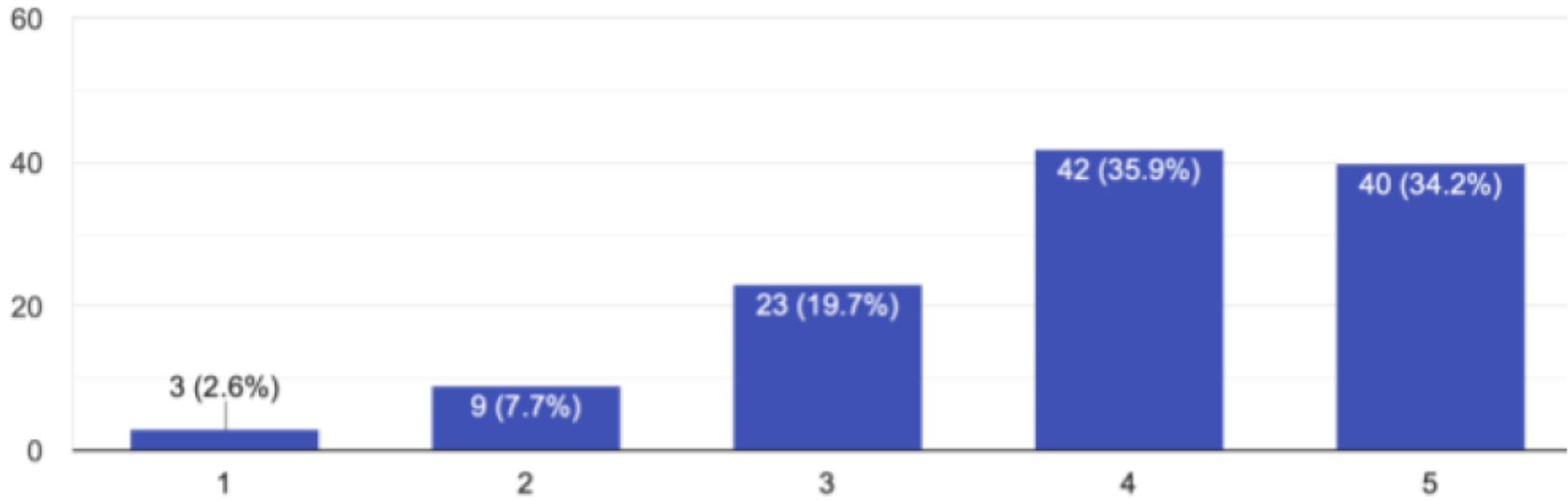
118 responses





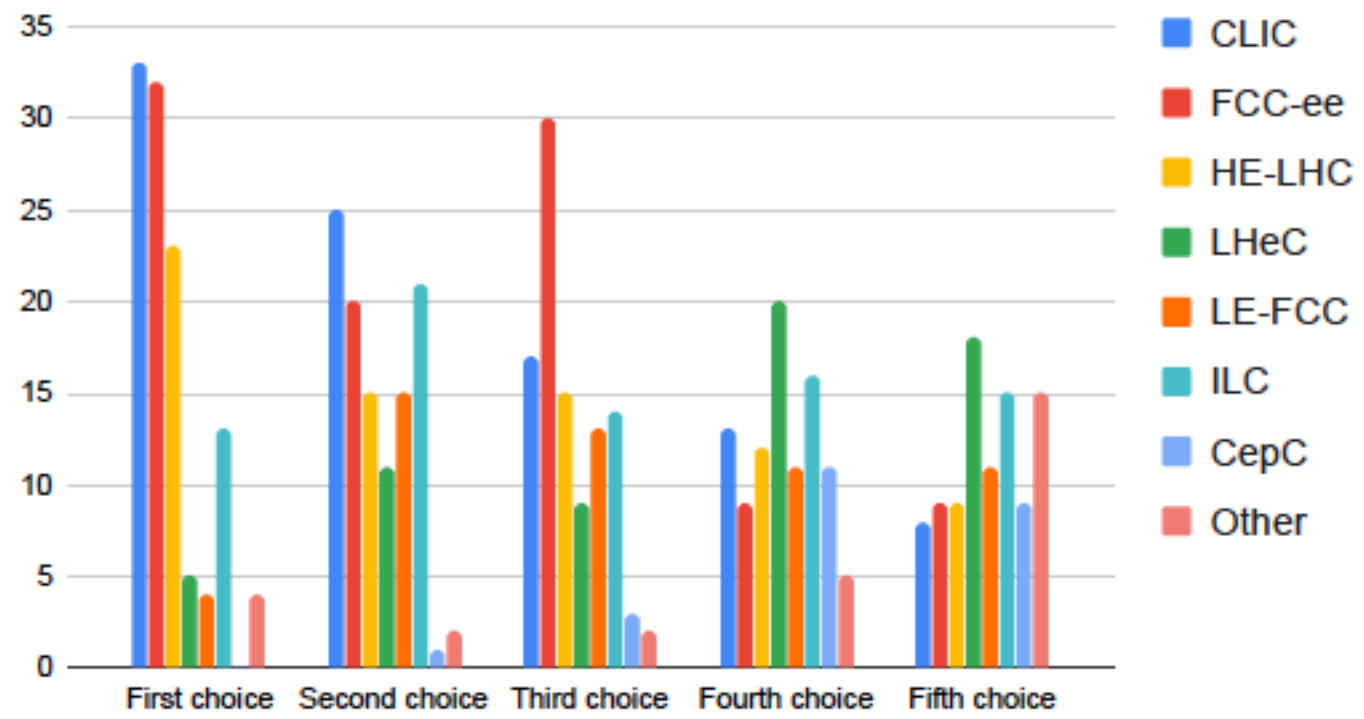
The next collider should be an e+e- machine?

117 responses





Preferred next generation collider



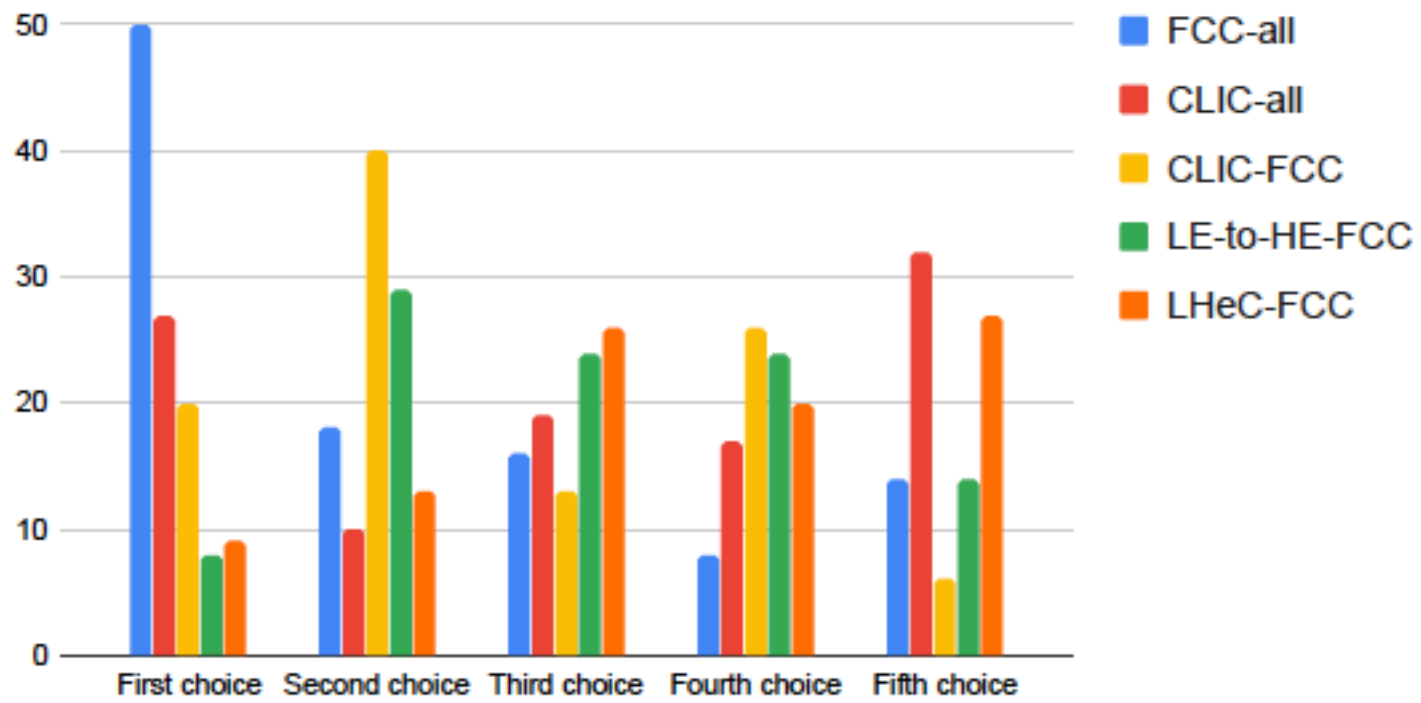
“Scenarios” for colliders in Europe

- With a strawman view to update the 2013 strategy and to further the discussions within the European Strategy Group (ESG) the following “scenarios” were defined revolving around future colliders at CERN.

	2020-2040	2040-2060	2060-2080
		1st gen technology	2nd gen technology
CLIC-all	HL-LHC	CLIC380-1500	CLIC3000 / other tech
CLIC-FCC	HL-LHC	CLIC380	FCC-h/e/A (Adv HF magnets) / other tech
FCC-all	HL-LHC	FCC-ee (90-365)	FCC-h/e/A (Adv HF magnets) / other tech
LE-to-HE-FCC-h/e/A	HL-LHC	LE-FCC-h/e/A (low-field magnets)	FCC-h/e/A (Adv HF magnets) / other tech
LHeC-FCC-h/e/A	HL-LHC + LHeC	LHeC	FCC-h/e/A (Adv HF magnets) / other tech

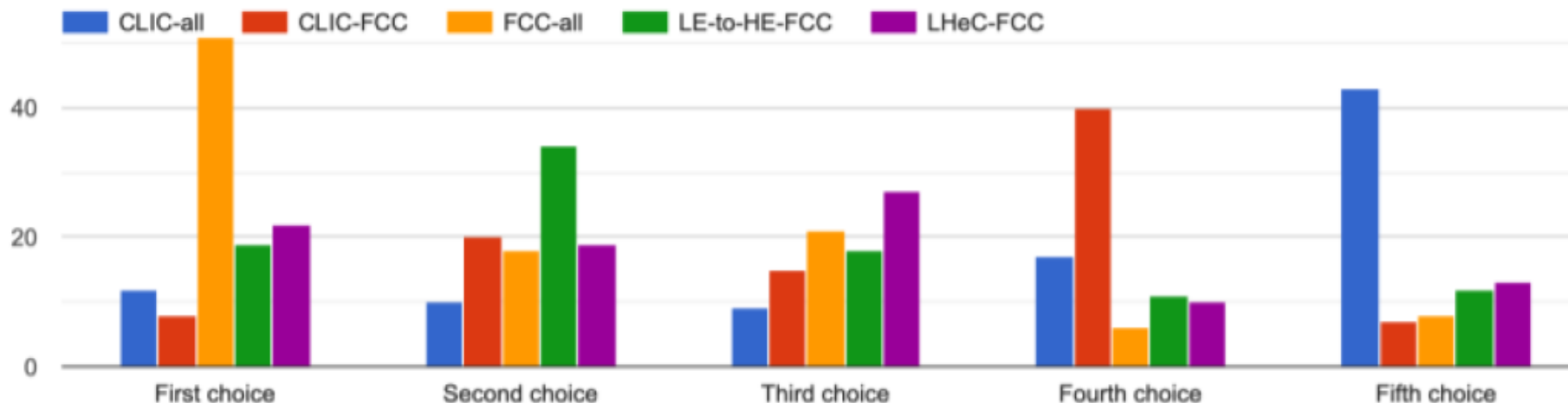


Preferred future collider scenario



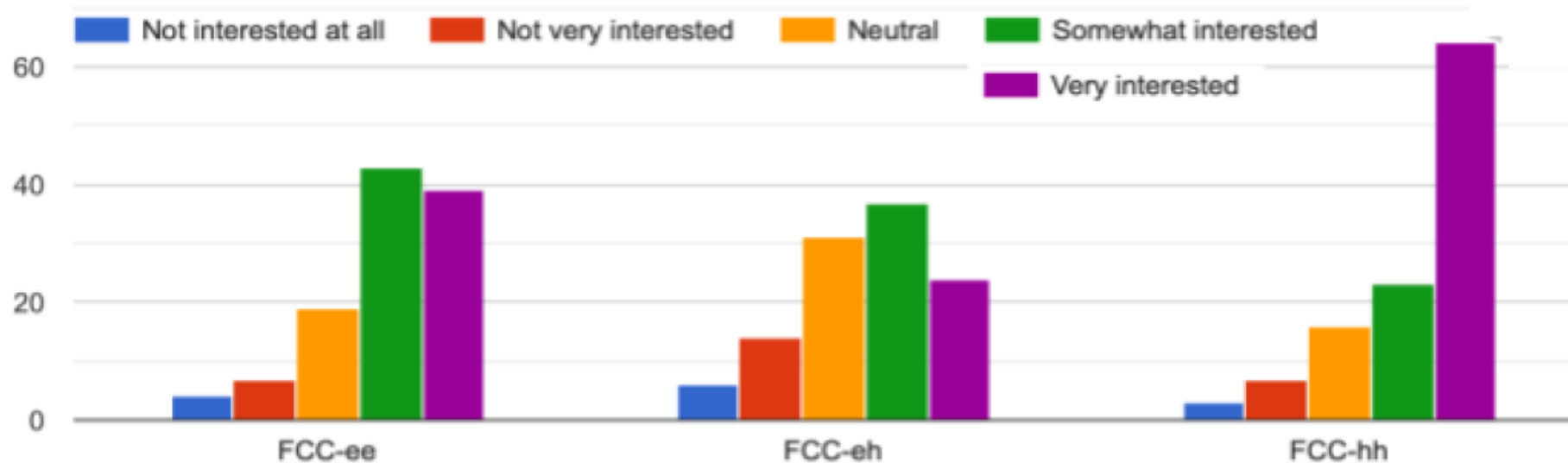


If the next e+e- collider is built in Asia, which of the future collider scenarios do you think should be CERN's focus?





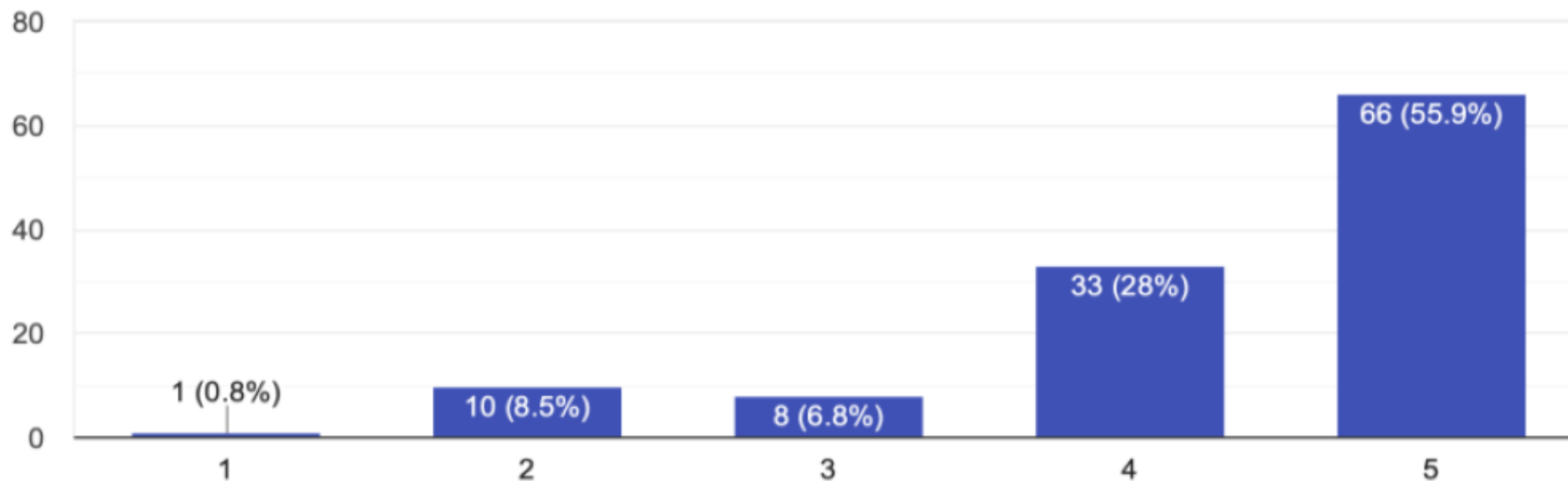
If you agree that CERN should build the FCC, which project(s) are you interested in?





Not building a collider at CERN soon after HL-LHC will negatively affect European particle physics research

118 responses

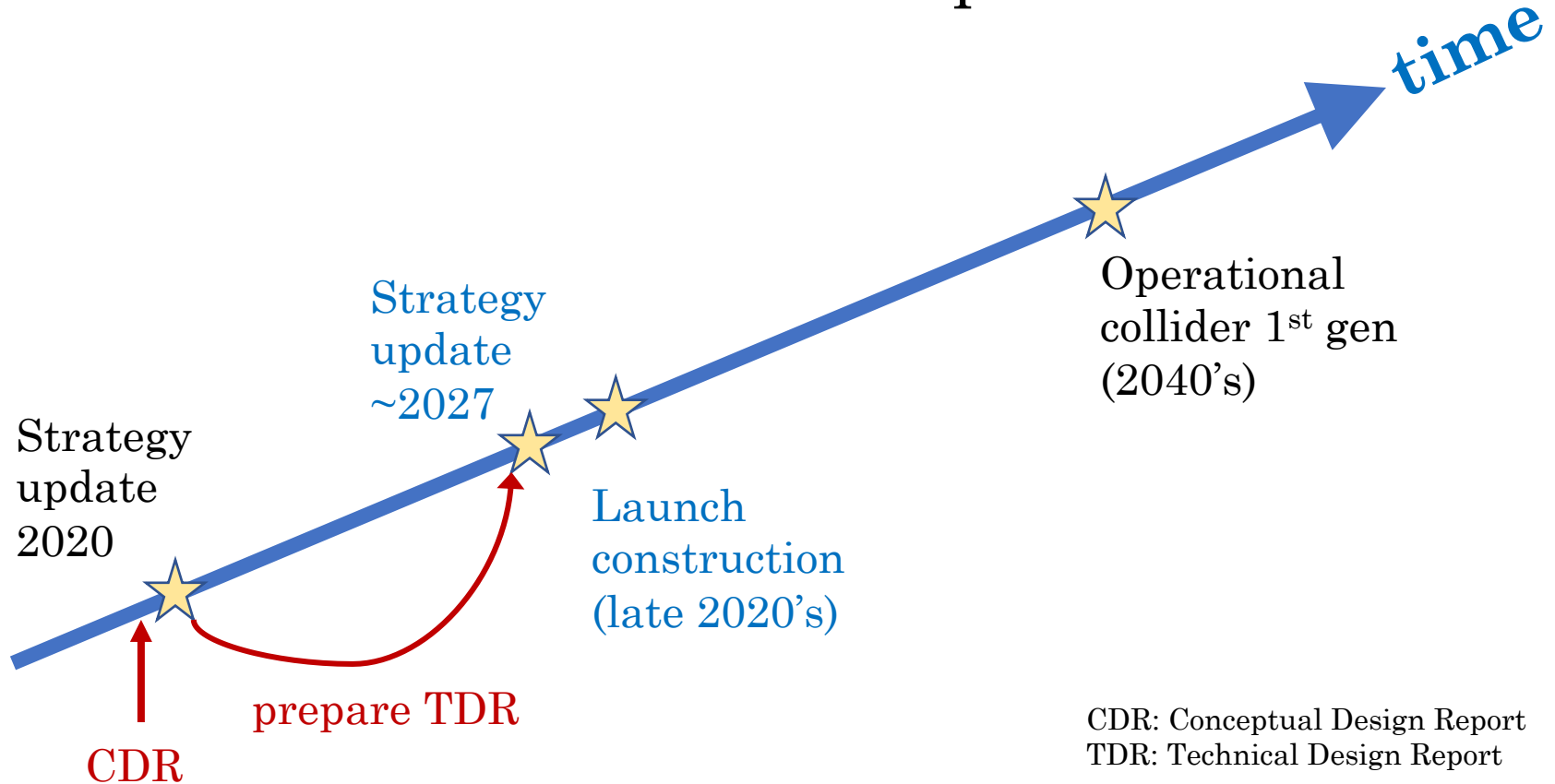




***Strategy debates are about bringing aspirations
coherently together***

*the central element to realize major progress in our field
revolves around a future collider programme at CERN beyond
the HL-LHC*

Typical path towards a new collider at CERN: select a collider scenario and plan for success





Input from ECFA
Detector R&D
Panel survey, ECFA
Recognition study,
etc.

Six Working Groups in the context of the European Strategy Group

WG1 – Social and career aspects for the next generation

WG2 – Organizational structure for European participation in global projects

WG3 – Relations with external bodies and fields of physics

WG4 – Knowledge and technology transfer

WG5 – Outreach, education and communication

WG6 – Sustainability and environmental impact

All of them reported and their observations were discussed with a view towards integrating these thoughts in the Strategy update



Brief report from the Bad Honnef meeting

- A very intensive week opened with overview presentations informing the discussions
- A series of topical plenary sessions followed on a variety of topics resulting in few pages of core “*strategy statements*” followed in the weeks after the meeting by a longer “*deliberation document*”
- Following the procedures, the ESG members endorsed the strategy statements unanimously
- The communication related to the convergence of the ESG:
<https://europeanstrategyupdate.web.cern.ch/node/32>
- Both the “*strategy statements*” and the “*deliberation document*” have been submitted to Council, but due to the COVID-19 pandemic, the special session of CERN Council for approval of the strategy, originally scheduled for 25 May 2020, has been postponed.



Representing the European particle physics community, ECFA will verify how to act upon the Strategy with a view to the next Strategy Update

- *The Strategy update is expected to provide a vision for the medium and long-term future for particle physics research, and the role of ECFA will always be to **help the community realizing coherently its vision** (e.g. ECFA delegate to the ILC organisation, ECFA Aix-les-Bains workshops on experiments at the HL-LHC)*
- *When preparing the future, the thoughts from Early-Career Researchers are essential, and accordingly ECFA will verify how it can create an **ECFA Early-Career Researchers Panel** within its organisation*
- *ECFA will explore how it can **help the experimental and theoretical communities involved in physics studies, experiment designs and detector technologies at future high-energy colliders to gather** in order to respond coherently to priorities set in the European strategy*

At this stage, we look forward to the Strategy update from Council, and surely for society and our research community to recover from the COVID-19 pandemic

Status of the ILC in Japan



Meanwhile, where are we with the ILC in Japan...

Following reports at the ICFA meeting at SLAC (20-22 Febr 2020)

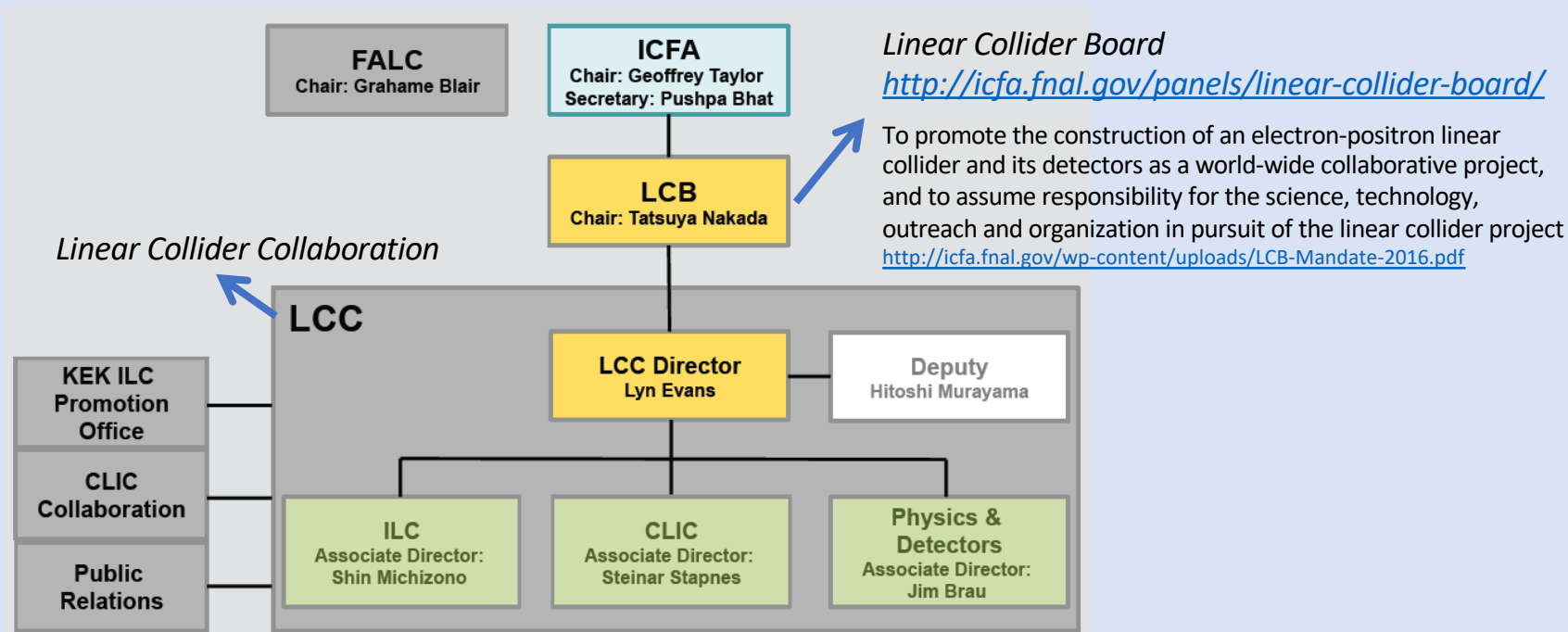
International Committee for Future Accelerators (<http://icfa.fnal.gov>)

Current ICFA members:

- G. Taylor (Chair, Australia), P. Bhat (Secretary, USA)
- **J. D'Hondt, F. Gianotti, J. Mnich (CERN Member States)**
- N. Lockyer, Z. Huang, J. Incandela (USA)
- I. Koop, V. Petrov (Russia)
- Y. Wang (China)
- T. Mori, M. Yamauchi (Japan)
- M. Roney (Canada)
- E. Álvarez, V. Matveev, P.A. Naik (Other Countries)
- H. Schellman, Chair of the IUPAP Commission on Particles and Fields (ex officio)



ICFA Panel: Linear Collider Board



Timeline of recent actions fo the ILC in Japan

- March 2019: the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) mentions the ILC project is to be considered by the Science Council of Japan (SCJ)
- Throughout 2019: the SCJ develops its Master Plan for Large-Scale Research Projects (all scientific disciplines)
- January 2020: in total 59 projects invited for the interview (including ILC) and among them 31 project listed as highest priority projects (not including ILC)
- MEXT to develop its resource-loaded Roadmap based on the SCJ Master Plan including all 59 projects invited for the interview (including the ILC); Roadmap expected around August 2020
- ICFA meeting: status report from MEXT by Hiroshi Masuko (Deputy Director-General, MEXT Research Promotion Bureau) and by Takeo Kawamura (Chair, Federation of Diet Members for ILC)

ICFA Statement on the ILC project – SLAC 22 February 2020

https://icfa.fnal.gov/wp-content/uploads/ICFA_Statement_22Feb2020.pdf

Part 1

ICFA was encouraged by the reports from Mr. H. Masuko, Deputy-Director General, MEXT Research Promotion Bureau and Hon. T. Kawamura, Chairperson of the Federation of Diet Members for the ILC, at the ICFA meeting held at the SLAC National Accelerator Laboratory, Stanford, USA, on the 20th February 2020.

Based on these reports:

- **ICFA reconfirms the international consensus for a Higgs factory** and wishes to see the timely construction of the ILC in Japan.
- **ICFA acknowledges and welcomes the inter-governmental discussion** between Japan, the United States and European nations, to advance international collaborative activities for the ILC.
- **ICFA notes the need for a preparatory phase** ahead of the establishment of the ILC laboratory and the construction of the ILC in Japan.



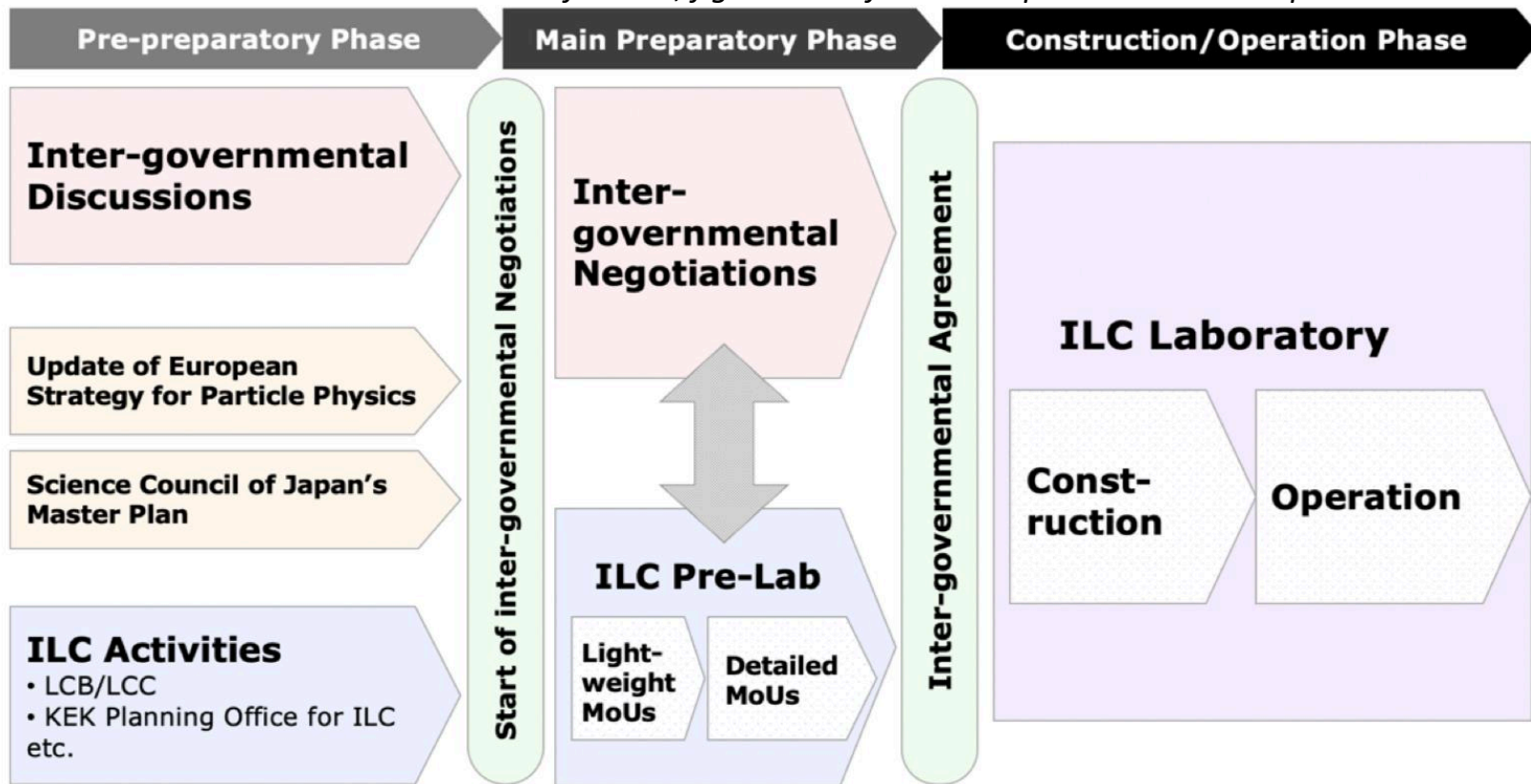
Report from International Working Group on the ILC Project

(initiated by KEK Director-General in May 2019 to study the international aspects)

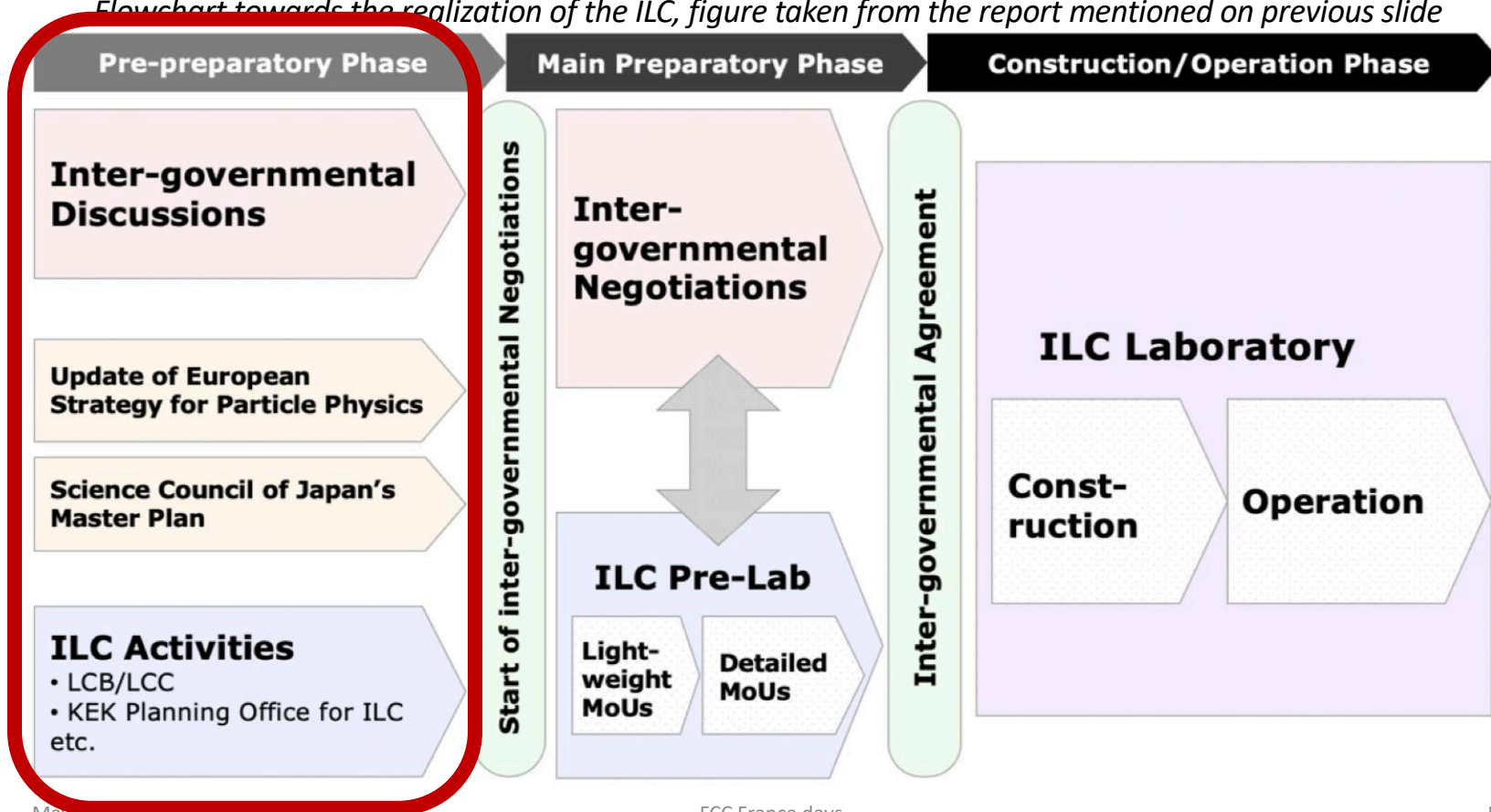
https://www2.kek.jp/ilc/en/docs/Recommendations_on_ILC_Project_Implementation.pdf

- ILC pre-preparatory phase: since about 8 years the project is in a pre-preparatory phase
- ILC preparatory phase: A positive signal by the Japanese government expressing its intent to host the ILC as part of the critical decision process will trigger the project transition into the main preparatory phase, which is expected to complete in about four years. The key activities in the main preparatory phase will be the technical preparations for ILC construction and the inter-governmental negotiations expected to culminate in an inter-governmental agreement, signaling the official launch of the ILC project.
- ILC construction phase: the above agreement will trigger the transition of the Pre-Lab structure into a full ILC Laboratory, which will mark the start of the construction phase of the ILC project

Flowchart towards the realization of the ILC, figure taken from the report mentioned on previous slide



Flowchart towards the realization of the ILC, figure taken from the report mentioned on previous slide



ICFA Statement on the ILC project – SLAC 22 February 2020

https://icfa.fnal.gov/wp-content/uploads/ICFA_Statement_22Feb2020.pdf

Part 2

- **ICFA advocates establishment of an international development team to facilitate transition into the preparatory phase.**
 - The development team should be hosted by KEK, with leadership chosen with the help of ICFA.
 - The team would **develop a plan for the preparatory phase** for the construction of the ILC, including technical, organizational and governance issues. It also would be tasked with understanding the activities and resources required in the preparatory phase. The process of developing the plan **should involve the interested laboratories and community.**
 - ICFA anticipates that these development activities could be **completed in approximately one year**, at which point it would be possible to launch the preparatory phase for the ILC, provided Japan expresses intent to do so together with international partners.
- In view of progress towards realisation of the ILC in Japan, ICFA encourages the interested members of the high energy physics community, laboratories, and nations, to support and participate in these preparations aimed at the successful establishment of the ILC.

ICFA Statement on the ILC project – SLAC 22 February 2020

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ICFA instructed the LCB to propose the mandate, the activities and the composition of the development team which is to replace the LCB structure. The new focus will be on the ILC project only.

- ICFA
- wh

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End

The European Particle Physics Strategy 2013

<https://cds.cern.ch/record/1567258/files/esc-e-106.pdf> - with the highest priority

- ① Europe's top priority should be the exploitation of the full potential of the LHC, including the high-luminosity upgrade of the machine and detectors with a view to collecting ten times more data than in the initial design, by around 2030. This upgrade programme will also provide further exciting opportunities for the study of flavour physics and the quark-gluon plasma.
- ② CERN should undertake design studies for accelerator projects in a global context, with emphasis on proton-proton and electron-positron high-energy frontier machines. These design studies should be coupled to a vigorous accelerator R&D programme, including high-field magnets and high-gradient accelerating structures, in collaboration with national institutes, laboratories and universities worldwide.
- ③ Europe looks forward to a [ILC] proposal from Japan to discuss a possible participation.
- ④ CERN should develop a neutrino programme to pave the way for a substantial European role in future long-baseline experiments. Europe should explore the possibility of major participation in leading long-baseline neutrino projects in the US and Japan.

The European Particle Physics Strategy 2013

Other scientific activities essential to the particle physics programme

- ① Europe should support a diverse, vibrant theoretical physics programme, ranging from abstract to applied topics, in close collaboration with experiments and extending to neighbouring fields such as astroparticle physics and cosmology. Such support should extend also to high-performance computing and software development.
- ② Experiments in Europe with unique reach should be supported, as well as participation in experiments in other regions of the world. Examples: quark flavour physics, dipole moments, charged-lepton flavour violation, etc.
- ③ Detector R&D programmes should be supported strongly at CERN, national institutes, laboratories and universities. Infrastructure and engineering capabilities for the R&D programme and construction of large detectors, as well as infrastructures for data analysis, data preservation and distributed data-intensive computing should be maintained and further developed.
- ④ In the coming years, CERN should seek a closer collaboration with ApPEC on detector R&D with a view to maintaining the community's capability for unique projects in this field.
- ⑤ The CERN Laboratory should maintain its capability to perform unique experiments. CERN should continue to work with NuPECC on topics of mutual interest.