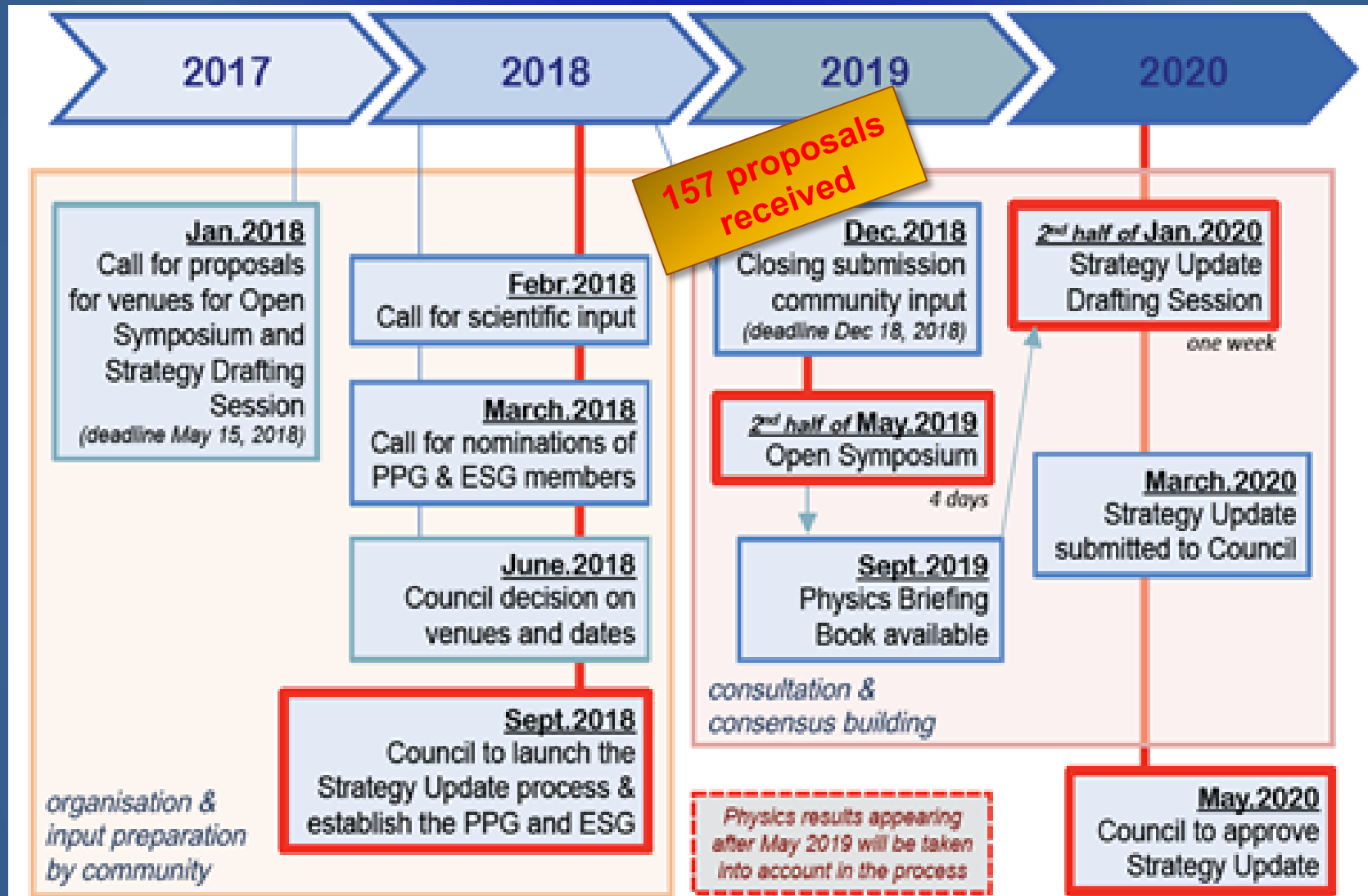




# News from European Strategy Update for Particle Physics

(largely based on slides from H. Abramowicz)

# European Particle Physics Strategy Update



H. Abramowicz

Around January 15<sup>th</sup> 2019 – open access to submissions for ESG  
Around end-January 2019 – open access to submissions for public

# e+e- Colliders ESU submissions (ILC, CLIC, FCC-ee, CEPC)

## The International Linear Collider A Global Project

Prepared by: Hiroaki Aihara<sup>1</sup>, Jonathan Bagger<sup>2</sup>, Philip Bambade<sup>3</sup>, Barry Barish<sup>4</sup>, Ties Behnke<sup>5</sup>, Alain Bellefleur<sup>6</sup>, Mikael Berggren<sup>7</sup>, James Brau<sup>7</sup>, Martin Breidenbach<sup>8</sup>, Ivanka Bozovic-Jelisavcic<sup>9</sup>, Philip Burrows<sup>10</sup>, Massimo Caccia<sup>11</sup>, Paul Colas<sup>12</sup>, Dmitri Denisov<sup>13</sup>, Gerald Eigen<sup>14</sup>, Lyn Evans<sup>15</sup>, Angeles Faus-Golfe<sup>3</sup>, Brian Foster<sup>5,10</sup>, Keisuke Fujii<sup>16</sup>, Juan Fuster<sup>17</sup>, Frank Gaede<sup>5</sup>, Jie Gao<sup>18</sup>, Paul Grannis<sup>19</sup>, Christophe Grojean<sup>5</sup>, Andrew Hutton<sup>20</sup>, Marek Idzik<sup>21</sup>, Andrea Jeremie<sup>22</sup>, Kiyotomo Kawagoe<sup>23</sup>, Sachio Komamiya<sup>1,24</sup>, Tadeusz Lesiak<sup>25</sup>, Aharon Levy<sup>26</sup>, Benno List<sup>5</sup>, Jenny List<sup>5</sup>, Shinichiro Michizono<sup>16</sup>, Akiya Miyamoto<sup>16</sup>, Joachim Mnich<sup>5</sup>, Hugh Montgomery<sup>20</sup>, Hitoshi Murayama<sup>27</sup>, Olivier Napoly<sup>12</sup>, Yasuhiro Okada<sup>16</sup>, Carlo Pagani<sup>28</sup>, Michael Peskin<sup>8</sup>, Roman Poeschl<sup>3</sup>, Francois Richard<sup>3</sup>, Aidan Robson<sup>29</sup>, Thomas Schoerner-Sadenius<sup>5</sup>, Marcel Stanitzki<sup>5</sup>, Steinar Stapnes<sup>15</sup>, Jan Strube<sup>7,30</sup>, Atsuto Suzuki<sup>31</sup>, Junping Tian<sup>1</sup>, Maksym Titov<sup>12</sup>, Marcel Vos<sup>17</sup>, Nicholas Walker<sup>32</sup>, Hans Weise<sup>5</sup>, Andrew White<sup>33</sup>, Graham Wilson<sup>33</sup>, Marc Winter<sup>34</sup>, Sakue Yamada<sup>1,16</sup>, Akira Yamamoto<sup>16</sup>, Hitoshi Yamamoto<sup>35</sup> and Satoru Yamashita<sup>1</sup>.

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(Representing the Linear Collider Collaboration and the global ILC community.)

(Dated: December 20, 2018)

### Abstract

A large, world-wide community of physicists is working to realise an exceptional physics program of energy-frontier, electron-positron collisions with the International Linear Collider (ILC). This program will begin with a central focus on high-precision and model-independent measurements of the Higgs boson couplings. This method of searching for new physics beyond the Standard Model is orthogonal to and complements the LHC physics program. The ILC at 250 GeV will also search for direct new physics in exotic Higgs decays and in pair-production of weakly interacting particles. Polarised electron and positron beams add unique opportunities to the physics reach. The ILC can be upgraded to higher energy, enabling precision studies of the top quark and measurement of the top Yukawa coupling and the Higgs self-coupling.

The key accelerator technology, superconducting radio-frequency cavities, has matured. Optimised collider and detector designs, and associated physics analyses, were presented in the ILC Technical Design Report, signed by 2400 scientists.

There is a strong interest in Japan to host this international effort. A detailed review of the many aspects of the project is nearing a conclusion in Japan. Now the Japanese government is preparing for a decision on the next phase of international negotiations, that could lead to a project start within a few years. The potential timeline of the ILC project includes an initial phase of about 4 years to obtain international agreements, complete engineering design and prepare construction, and form the requisite international collaboration, followed by a construction phase of 9 years.

Supporting documents web page:

<https://ilchome.web.cern.ch/content/ilc-european-strategy-document>

## The International Linear Collider A European Perspective

Prepared by: Philip Bambade<sup>1</sup>, Ties Behnke<sup>2</sup>, Mikael Berggren<sup>2</sup>, Ivanka Bozovic-Jelisavcic<sup>3</sup>, Philip Burrows<sup>4</sup>, Massimo Caccia<sup>5</sup>, Paul Colas<sup>6</sup>, Gerald Eigen<sup>7</sup>, Lyn Evans<sup>8</sup>, Angeles Faus-Golfe<sup>1</sup>, Brian Foster<sup>2,4</sup>, Juan Fuster<sup>9</sup>, Frank Gaede<sup>2</sup>, Christophe Grojean<sup>2</sup>, Marek Idzik<sup>10</sup>, Andrea Jeremie<sup>11</sup>, Tadeusz Lesiak<sup>12</sup>, Aharon Levy<sup>13</sup>, Benno List<sup>2</sup>, Jenny List<sup>2</sup>, Joachim Mnich<sup>2</sup>, Olivier Napoly<sup>6</sup>, Carlo Pagani<sup>14</sup>, Roman Poeschl<sup>1</sup>, Francois Richard<sup>1</sup>, Aidan Robson<sup>15</sup>, Thomas Schoerner-Sadenius<sup>2</sup>, Marcel Stanitzki<sup>2</sup>, Steinar Stapnes<sup>8</sup>, Maksym Titov<sup>6</sup>, Marcel Vos<sup>9</sup>, Nicholas Walker<sup>2</sup>, Hans Weise<sup>2</sup>, Marc Winter<sup>16</sup>.

<sup>1</sup>LAL-Orsay/CNRS, <sup>2</sup>DESY, <sup>3</sup>INN VINCA, Belgrade, <sup>4</sup>Oxford U., <sup>5</sup>U. Insubria, <sup>6</sup>CEA/Irfu, U. Paris-Saclay, <sup>7</sup>U. Bergen, <sup>8</sup>CERN, <sup>9</sup>IFIC, U. Valencia-CSIC, <sup>10</sup>AGH, Kraków, <sup>11</sup>LAPP/CNRS, <sup>12</sup>IFJ-PAN, Kraków, <sup>13</sup>Tel Aviv U., <sup>14</sup>INFN, <sup>15</sup>U. Glasgow, <sup>16</sup>IPHC/CNRS.

(Dated: December 20, 2018)

### Abstract

The International Linear Collider (ILC) being proposed in Japan is an electron-positron linear collider with an initial energy of 250 GeV. The ILC accelerator is based on the technology of superconducting radio-frequency cavities. This technology has reached a mature stage in the European XFEL project and is now widely used.

The ILC will start by measuring the Higgs properties, providing high-precision and model-independent determinations of its parameters. The ILC at 250 GeV will also search for direct new physics in exotic Higgs decays and in pair-production of weakly interacting particles. The use of polarised electron and positron beams opens new capabilities and scenarios that add to the physics reach. The ILC can be upgraded to higher energy, enabling precision studies of the top quark and measurement of the top Yukawa coupling and the Higgs self-coupling.

The international - including European - interest for the project is very strong. Europe has participated in the ILC project since its early conception and plays a major role in its present development covering most of its scientific and technological aspects: physics studies, accelerator and detectors. The potential for a wide participation of European groups and laboratories is thus high, including important opportunities for European industry.

Following decades of technical development, R&D, and design optimisation, the project is ready for construction and the European particle physics community, technological centers and industry are prepared to participate in this challenging endeavour.

Supporting documents web page:

<https://ilchome.web.cern.ch/content/ilc-european-strategy-document>

CLIC: <https://arxiv.org/abs/1812.07987>, <https://arxiv.org/abs/1812.07986>

FCC CDRs will be made public around Jan. 15 : <https://fcc-cdr.web.cern.ch>  
FCC-ee strategy input: [https://fcc-cdr.web.cern.ch/reports/EPPSU18\\_FCCee.pdf](https://fcc-cdr.web.cern.ch/reports/EPPSU18_FCCee.pdf)

CEPC: <https://arxiv.org/abs/1901.03169>, <https://arxiv.org/abs/1901.03170>

# Preparations towards 2019 Open Symposium (May'2019)

## LC community town meeting

- LCB reiterated that the Linear Collider community should form a unique position to be presented at the Open Symposium for the update of the European Strategy for Particle Physics taking place in Granada for May 13-16, 2019
- For this, the LCB asked LCC and relevant people to organise a community town meeting in Spring 2019  
Tentative plan is  
8-9 April 2019 at  
Swisstech Convention Centre @ EPFL,  
in Lausanne

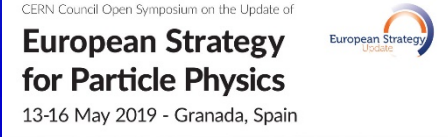
**T. Nakada,  
LCWS2018**

## Three inputs for the town meeting


- Documents submitted for the European Strategy update
  - CLIC: project description and physics & detector
  - ILC: machine & physics and European capabilities
- Statement (or no statement?) from Japanese government  
Repeated message to Japan has been
  - For the ILC to proceed further, we need a statement from the Japanese government by the ~~end of this year~~ **March 2019**
    - expressing its intention to host the ILC with substantial contribution, e.g. civil construction, infrastructure and an appropriate share for the accelerator, and
    - inviting interested international partners to discuss realisation
  - No statement would also have a consequence
- Assessment of the situation by LCB/ICFA made at their meetings on 7-8 March 2019

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**European Strategy Update 2018-2020 webpage:  
<http://europeanstrategyupdate.web.cern.ch>**




CERN Council Open Symposium on the Update of  
**European Strategy  
for Particle Physics**  
13-16 May 2019 - Granada, Spain



Physics Preparatory Group	Local Organizing Committee
Halima Abramowicz (Chair)	Francisco del Aguila
Shoji Asai	Antonio Bueno (Chair)
Stan Bentvelzen	Alberto Casas
Caterina Biscari	Nicolas Collini
Mazela Carena	Leonid Rivkin
Jorgen D'Hondt	Paula Sphar
Keith Ellis	Brigitte Vanham
Belen Gavela	Maria José Garcia Berce
Gian Giudice	Igor Garcia Irastorza
	Eugenio Grauges
	Juan José Hernández
	María Martínez
	Benjamín Sánchez Gimeno
	José Santiago

<https://cafpe.ugr.es/epps2019/>  
epps2019@pcgr.org

Sponsored by:



CERN Council Open Symposium on the Update of  
European Strategy for Particle Physics  
13-16 May 2019 - Granada, Spain

# Preliminary Format of the Open Symposium



EPPSU 2020

## Format of the Open Symposium

### Monday

#### Morning

##### Plenary session

"Where do we stand"  
(still to be discussed)

#### Afternoon

##### Parallel sessions

B1 - Electroweak physics  
B2 - Flavour physics and  
CP violation  
B3 - Neutrinos  
B4 - Accelerator science  
and technology

### Tuesday

#### Morning

##### Parallel sessions

B5 - BSM at colliders  
B6 - Strong interactions  
B7 - Detectors and  
computing  
B8 - Dark matter and dark  
sector

#### Afternoon

##### Parallel sessions

(possible merging)  
B1 - Electroweak physics  
B2 - Flavour physics and  
CP violation  
B3 - Neutrinos  
B4 - Accelerator science  
and technology

### Wednesday

#### Morning

##### Parallel sessions

(possible merging)  
B5 - BSM at colliders  
B6 - Strong interactions  
B7 - Detectors and  
computing  
B8 - Dark matter and dark  
sector

#### Afternoon

##### Plenary session

"Future facilities"

### Thursday

##### Plenary session

Summary Reports (8)  
Close-out

ESG meeting

# European Particle Physics Strategy Update

## Composition of Physics

## Composition of European Strategy

### Preparatory Group (PPG) - 17 people:

### Group (ESG) - 65 people:

#### STRATEGY SECRETARIAT

Scientific Secretary (Chair)	Prof. Halina Abramowicz (IL)
SPC Chair	Prof. Keith Ellis (UK)
ECFA Chair	Prof. Jorgen D'Hondt (BE)
Chair EU Lab. Directors' Mtg	Prof. Lenny Rivkin (CH)

#### SPC

Prof. Caterina Biscari (ES)
Prof. Belen Gavela (ES)
Prof. Beate Heinemann (DE)
Prof. Krzysztof Redlich (PL)

#### ECFA:

Prof. Stan Bentvelsen (NL)
Prof. Paris Sphicas (GR)
Dr Marco Zito (FR)
Prof. Antonio Zoccoli (IT)

#### ASIA/AMERICAS

Prof. Shoji Asai (Japan)
Prof. Marcela Carena (USA)
Prof. Xinchou Lou (China)
Prof. Brigitte Vachon (Canada)

#### CERN

Dr Gian Giudice
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#### MEMBERS

##### Member States

Austria	Prof. Jochen Schieck
Belgium	Prof. Dirk Ryckbosch
Bulgaria	Prof. Leander Litov
Czech Republic	Prof. Tomas Davidek
Denmark	Prof. Jens-Jørgen Gaardhøje
Finland	Prof. Paula Eerola
France	Dr Reynald Pain
Germany	Prof. Siegfried Bethke
Greece	Prof. Costas Fountas
Hungary	Prof. Peter Levai
Israel	Prof. Eliezer Rabinovici
Italy	Prof. Fabio Zwirner
Netherlands	Prof. Eric Laenen
Norway	Prof. Gerald Eigen

#### ESG INVITEES

President of the CERN Council	Prof. Sijbrand de Jong
<i>Associate Member States in the pre-stage to Membership</i>	
Cyprus	Prof. Panos Razis
Serbia	Prof. Peter Adzic
Slovenia	Prof. Boštjan Golob
<i>Associate Member States</i>	
Lithuania	tbc
Turkey	Mr Alper Yüksel
Ukraine	Dr Maxim Titov

#### States with special Observer status (LHC)

Japan	Prof. Yasuhiro Okada
Russian Federation	Prof. Vladimir Kekelidze
United States of America	Dr Abid Patwa

#### Organisations with Observer status

European Commission	tbc
JINR	Prof. Boris Sharkov

#### Other invitees

Chair ApPEC	Prof. Antonio Masiero
Chair ESFRI	Prof. Giorgio Rossi
Chair FALC	Prof. Grahame Blair
Chair NuPECC	Prof. Marek Lewitowicz
Other members of the PPG (in addition to the Strategy Secretariat)	

Poland	Prof. Jan Królikowski
Portugal	Prof. Gaspar Barreira
Romania	Dr Alexandru-Mario Bragadireanu
Slovakia	Prof. Stanislav Tokar
Spain	Prof. Maria José Garcia Borge
Sweden	Prof. Kerstin Jon-And
Switzerland	Prof. Tatsuya Nakada
United Kingdom	Prof. Jonathan Butterworth

CERN Director-General	Dr Fabiola Gianotti
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#### Major European National Labs

CIEMAT	Dr Nicanor Colino
DESY	Prof. Joachim Mnich
IRFU	Prof. Anne-Isabelle Etievre
LAL	Prof. Achille Stocchi
NIKHEF	tbc
LNF	Dr Pierluigi Campana
LNGS	Prof. Stefano Ragazzi
PSI	Prof. Klaus Kirch
STFC-RAL	Prof. Mark Thomson

#### Strategy Secretariat Members

## Proposed Input Themes and PPG/ESG assignments

- Large experiments and projects - PPG
- National road maps - ESG
- Accelerator Science and Technology - Caterina Biscari and Lenny Rivkin
- Beyond the Standard Model at colliders (present and future) - Gian Giudice (th) and Paris Sphicas (exp)
- Dark matter and dark sector (accelerator and non-accelerator dark matter, dark photons, hidden sector, axions) - Marcela Carena (th) and Shoji Asai (exp)
- Instrumentation and computing - Xinchou Lou (exp) and Brigitte Vachon (exp)
- Electroweak physics (physics of the W, Z, H bosons, of the top quark, and QED) - Keith Ellis (th) and Beate Heinemann (exp)
- Flavour Physics and CP violation (quarks, charged leptons and rare processes) - Belen Gavela (th) and Antonio Zoccoli (exp)
- Neutrino physics (accelerator and non-accelerator) - Stan Bentvelsen (astro-exp) and Marco Zito (exp)
- Strong interactions (perturbative and non-perturbative QCD, DIS, heavy ions) - Krzysztof Redlich (th) and Jorgen D'Hondt (exp)
- Other (communication, outreach, strategy process, technology transfer, individual contributions,...) - ESG

There are 8 physics themes and 3 general ones. The large experiments/projects will be split among the physics themes.

## Proposal for ESG meetings

- First plenary meeting, Friday March 15, 2019, CERN - review of previous strategy update, converge on main themes for the present update and the mandates and chairs of the agreed upon working groups (to be partly prepared by email communication)

Subsequent plenary meetings for discussions and interim reports:

- Thursday May 16, Granada
- During Council weeks at CERN, in June 2019, September 2019, December 2019 - either Tuesday afternoon and/or Wednesday afternoon.
- Drafting Session - January 20-24, 2020 in Bad Honnef
- To be considered - plenary meeting at CERN in March 2020 to include comments of Council
- Working Group meetings as needed, to be organized by designated chairs of the agreed upon groups



**THANK YOU !**

