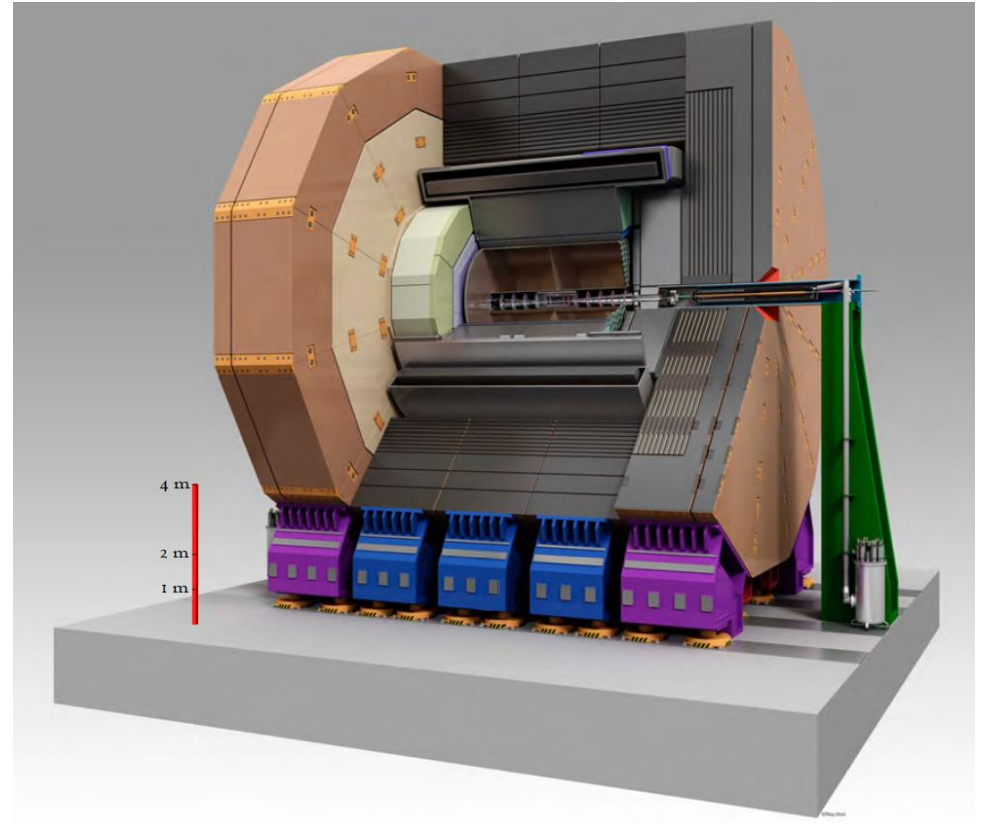




# Future of ILD

Ties Behnke  
26.2.2019  
ILD meeting  
KEK2019



# What to talk about



- Short term future: how to react to the March statement (scenarios..?)
  - Lausanne meeting
  - Granada meeting
  - Pushing our agenda in view of the ESU
- Longer term future
  - Further development of ILD as a collaboration/ group
  - What are the next steps we need to take

Assumption: the statement in March is substantial enough that ILD has a future.

# The Context



- The Japanese situation (more details in Keisukes report earlier today)
- The European Strategy is gathering speed

A complex situation

Planning is very difficult

We need to move step by step

# The European Strategy



European Strategy Document for ILD:

<https://www.overleaf.com/read/tqfjghmdjrzp>

Supplementary document (more details, about 100 pages)

[https://pages.uoregon.edu/jimbrou/LC/ILC\\_European\\_Strategy\\_Document.pdf](https://pages.uoregon.edu/jimbrou/LC/ILC_European_Strategy_Document.pdf)

This document is meant to provide additional detail in the discussions in the European Strategy Update process

# Next steps in ESU



April 8/9 at Lausanne: Meeting of the linear collider European Community

- Discuss the state of the different e+e- projects (focus on linear?)
- Develop / try to develop a European perspective on these projects
- Prepare for the open symposium in Granada in May 2019

May 13-17, Granada, Spain

- Open symposium to discuss all ideas which are on the table for the European Strategy
- Basis of the discussions are the input documents submitted to ESU end 2018

# Lausanne meeting



Things which we should discuss/ clarify:

- IF the March report is strong enough: how do we ensure significant support for ILC/ ILD

Position towards CLIC?

- In particular if the statement in March is ambiguous: how do we position ourselves towards CLIC?

**Political support:** ILC has been considered in depth over a number of years by the government of Japan, which is soon expected to make **an Expression of Interest to host the project.**

Politicians, governments, and funding agencies in Japan have been discussing the ILC with their counterparts in Europe and the US for a number of years, and have been encouraged by these discussions.

**Other large collider projects have not yet reached a similar stage.**

**Technical maturity:**

The RDR (CDR equivalent) for the ILC was published in 2007 and the **TDR in 2013.**

**Circular collider projects have only recently published their CDRs.**

The ILC's quoted performance and costs are deeply understood and thus reliable.

**Timeline:** Given a go-ahead, the ILC will very soon be ready to start construction. First collisions can occur within around 15 years from now.

**According to current run plans, the ILC will complete its 2 ab<sup>-1</sup> 250 GeV run at about the time FCCee begins its ZH run.**

**Physics:** Beam polarization is a powerful tool not available at high energy circular colliders.

When measuring Higgs couplings, **polarization compensates for the lower integrated luminosity at 250 GeV compared to FCCee (2 vs 5 ab<sup>-1</sup>)** not just by the increased rates but also by its power to remove some correlations among different EFT operators.

In the case that ILC observes new phenomena other than in the Higgs couplings, polarization will play an essential role in determining their chiral properties.

Polarization will also allow **systematic uncertainties** on many measurements **to be significantly reduced.**

**Upgradeability:** The ILC's collision energy can be readily upgraded to 500 GeV and above.

**A technical design for a 500 GeV stage exists.**

Likewise, **a technical design exists for upgrading the luminosity:**

- **by a factor 2 by doubling the number of bunches per pulse,**
- **another factor 2 by doubling the repetition rate.**

The ILC250 infrastructure is reusable. It provides long-term perspectives beyond current technologies (e.g. a plasma-based accelerator).

# My personal take



- If the statement is strong: there will be strong support to push ILC on the top of the European strategy
  - We then need to support this as much as we can
- If the statement is not strong enough:
  - We want electron positron collisions
  - We want a linear collider because of the energy extensibility
  - We want the ILC since ILC is mature and we know that we can build this
  - We want CLIC as the next-best thing

CLIC: the role of ILD in CLIC is not obvious,  
CLIC probably means the end of ILD as a group



# ILD future: Kiyotomos talk



- MEXT is going to present an official statement of Japanese government at the ICFA/LCB meeting on March 7 in Tokyo.
- Let's assume a positive statement (how positive ??).
  - Reaction to the EPPSU process
    - The ILC must be well described in the final document of EPPSU (May 2020).
    - IDR should be published as a support document.
  - Toward a “real” experimental group
    - New institutions, new members
    - New detector concepts ? One or two detectors ?
  - Toward Technical Design Report
    - Further optimization of the detector
    - Further R&D of subdetectors
    - New technologies of subdetectors
    - Technical choice of subdetectors
    - Planning of detector construction/installation
    - Task sharing and cost sharing

# The IDR as a first step



Comprehensive document to describe the state of ILD

- Description of the system and its “philosophy”
- Describe the development in particular of technology which has happened since our last document
  - Subdetectors
  - Simulation
  - reconstruction
- Describe the effort to optimise ILD: ILD-S and ILD-L
- Describe the science program we want to do with ILD
- Update the costing
- Update the ILD integration
- Update the site specific considerations

# ILD Future



If ILC moves forward, we need to re-think the way we organise the experimental community/ the experiments

- Learn from LHC experiments
- Think about our structures
- How de-central do we want to be/ how central
- How do we approach the issue of open data/ open science
  
- Prepare to handle an expected significant growth of ILD

This interim period might be an excellent opportunity to discuss this on a broad basis and re-think some of the approaches to large collaborations we are used to.

# ILD future: R&D plan



Prepare an R&D plan for this interim period

- Together and relying on the R&D collaborations
- But based on the needs and requirements by ILD

Prepare an engineering plan for ILD

- Based on the current results
- Addressing the open ends and problems

Prepare an integration plan for ILD

- Continue and build on the current work, in particular the E-JADE work
- Strong interaction with the local ILC effort is needed

We need to find a way to organise this and to ensure a certain degree of coherence.

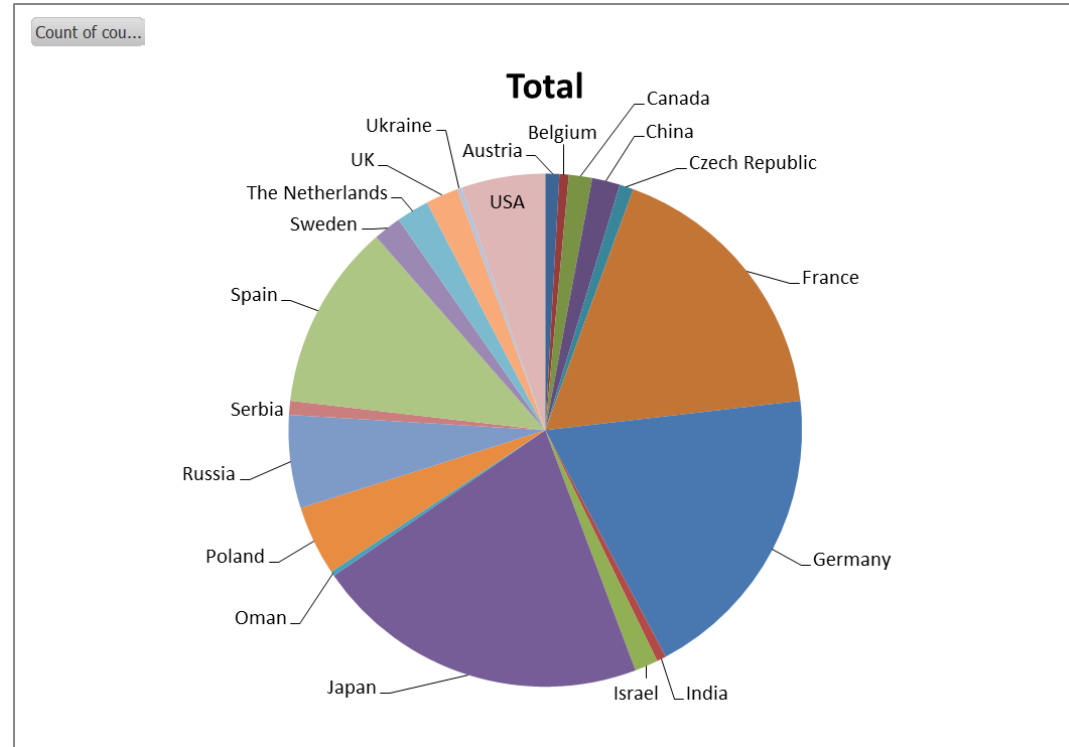
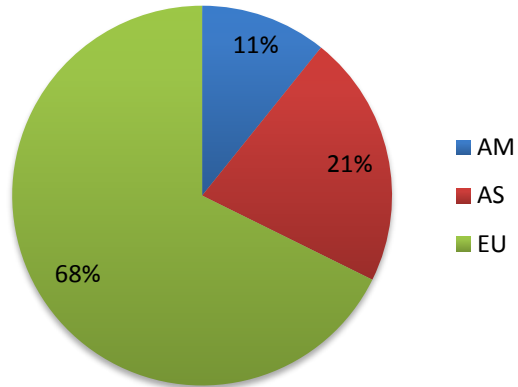
# The Collaboration



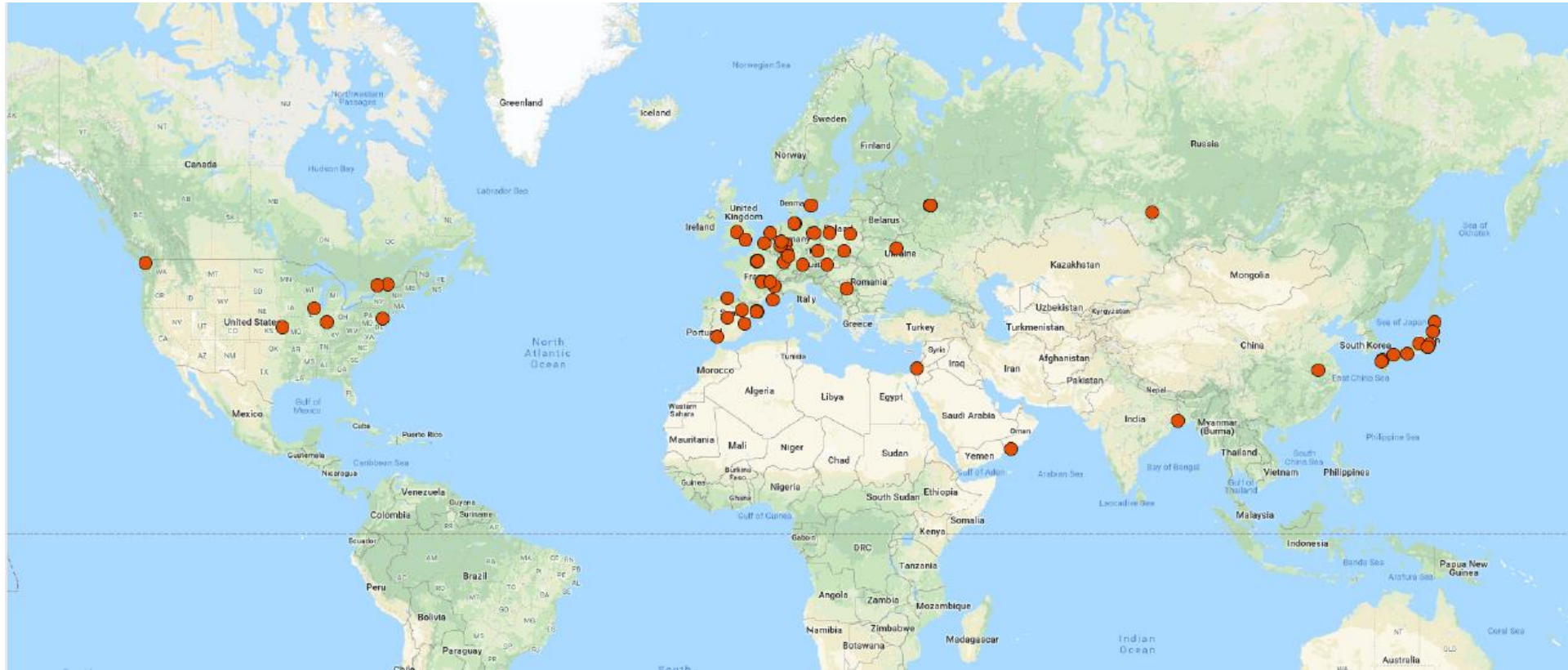
Result of recent membership confirmation:

- 65 institutes confirmed ILD membership
- 8 institutes did not confirm
- Several new requests

## institutes per region



# ILD around the world



# ILD Collaborative Tools



ILD Web page: <http://www.ilcild.org>

- Transition to new server has happened
- Content is still marginal
- Help is very welcome to fill the WEB page and to continue to improve the logic

ILD confluence page <https://confluence.desy.de/display/ILD/ILD>

- Overall useful system, intensely used by some groups
- Problem of access for the complete ILD group is still not solved

# ILD formalities



After March:

- Need to re-elect ILD management
  - Postponed election in SLAC ILD meeting by one year
  - Spokesperson election
  - ET member election
  - Coordinator election