



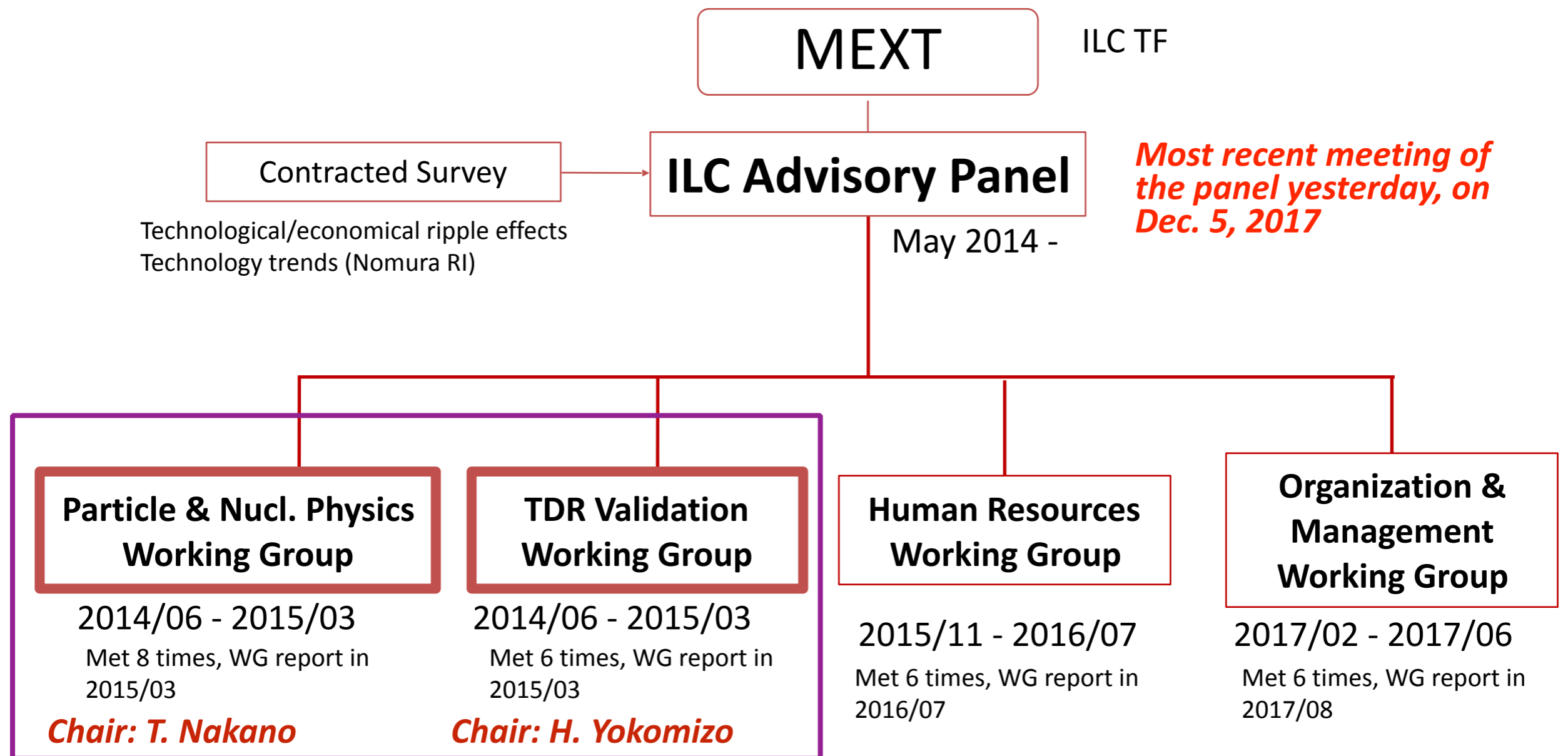
Report from Physics WG

Keisuke Fujii
on behalf of the Physics WG
April 3, 2018

MEXT Review

ILC Advisory Panel

Set up in May 2014 under MEXT ILC Task Force to investigate various issues concerning the possibility of hosting the ILC in Japan



New round started from January 2018.

MEXT Particle and Nuclear Physics WG

Charge

Taking into account the recommendations made in the interim report by the MEXT ILC Panel, review the 250 GeV ILC physics case and clarify potential issues if any.

Members

1. **Takaaki Kajita (deputy chair) : Cosmic Ray Research**
2. **Sachio Komamiya : HEP**
3. **Hideyuki Sakai : Nuclear Physics**
4. **Seiji Tanabashi : HEP (theory)**
5. **Fiji Chin : Accelerator**
6. **Katsuo Tokushuku : HEP**
7. **Takeshi Nakano (chair) : Nuclear Physics**
8. **Tsuyoshi Nakaya : HEP**
9. **Tetsuo Hatsuta : Nuclear Physics (theory)**
10. **Ryugo Hayano : HEP**
11. **Shigeki Matsumoto : HEP (theory)**
12. **Taku Yamanaka : HEP**
13. **Hiromi Yokoyama : Scientific Communication**

1st meeting on Jan. 18

- **General remark from the secretariat (WG charge, history)**
- **Development of the LHC experiment: K. Hanagaki**
- **On the revision of the ILC project (Physics Case of the 250 GeV ILC): K. Fujii**
LCC Physics WG Report (arXiv: 1710.07621)

2nd meeting on Feb. 5

- **Discussions in JAHEP: S. Asai**
Asai committee's report (arXiv: 1710.08639)
- **Physics potential of the ILC at 250 GeV: G. Weiglein**

3rd meeting on March 1: discussions on skeleton draft

- **Main points in the discussions so far**
- **Comparison of scientific case of 500 GeV ILC and 250 GeV ILC (Comparison Table)**

The 4th Meeting of the Particle & Nuclear Physics WG will happen on

April 13, 2018

- *Hearings on XFEL/FAIR*
- *Discussions on the draft WG report*

The 4th Meeting of the TDR Validation WG will happen on

April 19, 2018

***ILD Physics WG
Status and Plan***

ICHEP Abstracts

- Study of the Higgs couplings to leptons and Higgs CP properties at the ILC
- 3rd Generation Quark and Electroweak Boson Couplings at the 250 GeV stage of the ILC
- Search for Light Scalars Produced in Association with a Z boson at the 250 GeV stage of the ILC

The confluence page

<https://confluence.desy.de/display/ILD/ILD+Physics+Working+group>

Benchmark subpage (see next page):

<https://confluence.desy.de/display/ILD/Benchmarks+for+physics-driven+detector+optimisation>

- A separate page for each benchmark process with an outline of the analysis and a clear definition of observables to compare, being prepared by corresponding WG conveners.

Individual WG subpages:

Higgs/EW: <https://confluence.desy.de/pages/viewpage.action?pageId=53745418>

Top/QCD: <https://confluence.desy.de/pages/viewpage.action?pageId=53745432>

BSM/NP: <https://confluence.desy.de/pages/viewpage.action?pageId=53745434>

- WG conveners will ask for feedback from their respective WG members.

Independent/separate pages for tools (to be constructed):

- Particle ID, Isolated Lepton Tagging, Flavor Tagging Tau Reconstruction, Pi0 Reconstruction, Jet Clustering, Kinematic Fitting, Vertex Charge, Matrix Element Method, etc.

Benchmarks for physics-driven detector optimisation

Jenny List posted on 02. 3. 2018 08:37h - last edited by Jenny List on 02. 3. 2018 08:48h

For a full list and questions to be addressed for each benchmark see [presentation by J.List at ILD Workshop 2018](#)

- hadronic branching ratios of the Higgs: $H \rightarrow bb/cc/gg$
- Higgs mass from $H \rightarrow bb$
- branching ratio $H \rightarrow \mu^+ \mu^-$
- limit on $H \rightarrow \text{invisible}$
- tau polarisation, A_{FB} , A_{LR} , decay modes in $e^+e^- \rightarrow \tau^+ \tau^-$
- W mass, TGCs, beam polarisation from $e^+e^- \rightarrow WW \rightarrow qq \nu \nu$
- QGCs $e^+e^- \rightarrow \nu \nu \nu \nu qq qq$
- A_{LR} , JES calibration from $e^+e^- \rightarrow \gamma Z$
- A_{LR} , A_{FB} from $t\bar{t} \rightarrow bb qq qq$
- discovery range, cross-sections, masses for low delta M Higgsinos. [Details.](#)
- discovery range, mass, cross-section, operator type for WIMPs in mono-photon channel. [Details.](#)
- discovery range for low mass extra Higgses in $e^+e^- \rightarrow Zh$. [Details.](#)

Jet Clustering WG

- to be formed under the leadership of Marcel Vos and Junping Tian.

Benchmarks for physics-driven detector optimization

A new web page for benchmarks for physics-driven detector optimization:

<https://confluence.desy.de/display/ILD/Benchmarks+for+physics-driven+detector+optimisation>

which is developing together with the three subgroup pages.

Take a look and send your comments to the physics conveners mailing list:

ild-physics-conveners@desy.de

We urge your active contributions to the benchmark studies!