



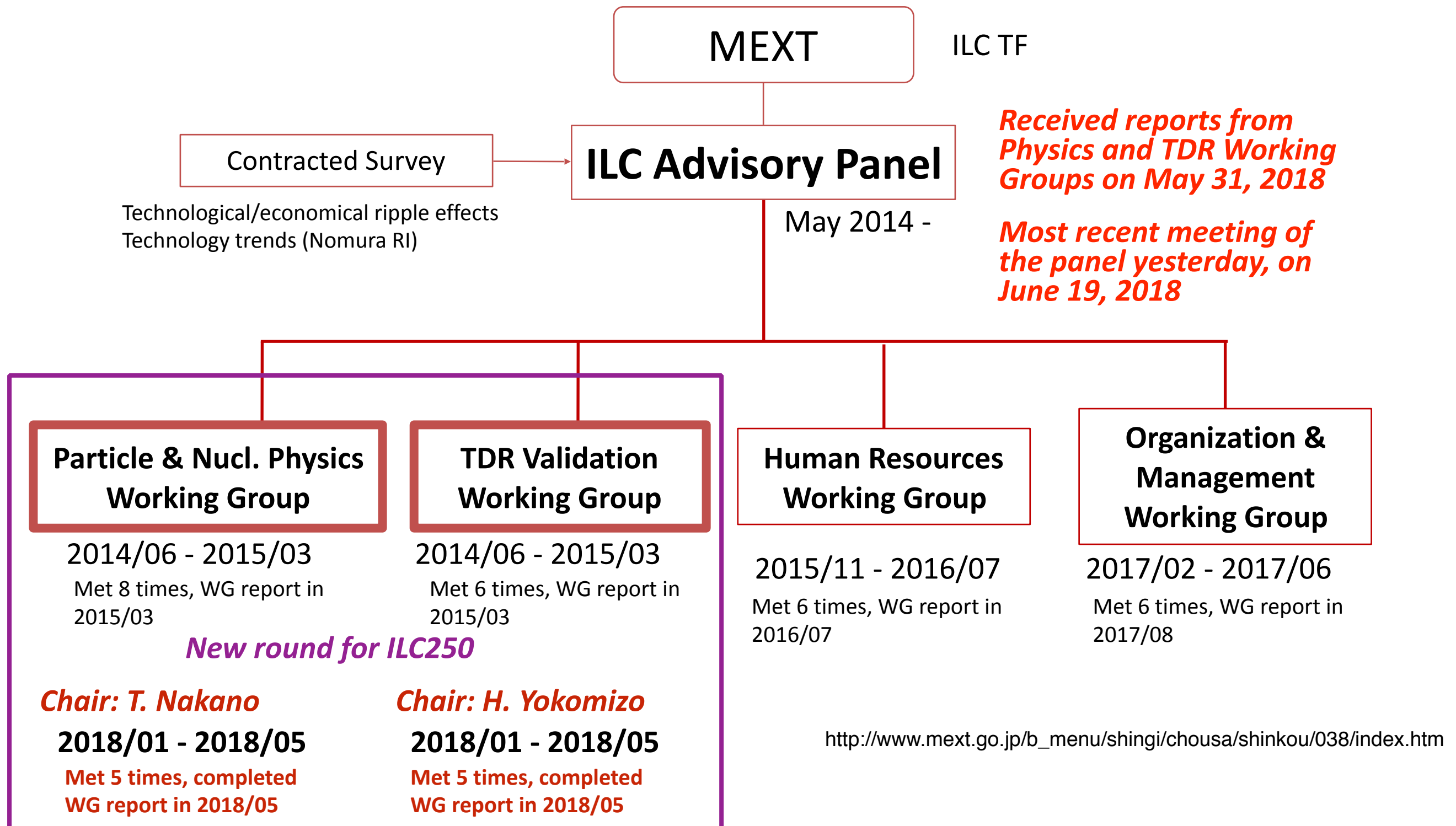
Report from Physics WG

Keisuke Fujii
on behalf of the Physics WG
July 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



The panel met on June 19 to discuss

- *reevaluation of economical ripple effects*
 - *gain factor of 3 (from CERN's experience)*
 - basically approved for economical ripple effects of ILC250.*
- *international collaboration*
 - *international support questioned. ILC has to be a truly international project, which may become difficult if the host country dominates the contribution to the project.*
- *a skeleton draft*
 - *a full draft will be circulated to panel members for feedback before **the next (and hopefully last) meeting on July 4.***

ILD Physics WG Status and Plan

ICHEP Practice Talks (ILD)

July 2, 2018 (yesterday)

<https://agenda.linearcollider.org/event/7977/>

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

ICHEP Practice Talks (LCC)

June 29, 2018

<https://indico.cern.ch/event/739115/>

- The role of positron polarization for the initial 250 GeV stage of the International Linear Collider: ***Juergen Reuter***
- Precision Higgs measurements at the 250 GeV ILC: ***Tomohisa Ogawa***
- The potential of the ILC for discovering new particles: ***Mikael Berggren***

Papers (recent development)

- Measuring the CP state of tau lepton pairs from Higgs decay at the ILC (arXiv:1804.01241): ***Daniel Jeans & Graham Wilson***
→ accepted for publication in PRD.
- Kinetic Edge Detection Using Finite Impulse Response Filters: ***Madalina Chera*** → *We will hear about it later today.*
- *Several more (still) in pipeline*

Benchmark Studies

Updated list of benchmarks

Physics Benchmarks - reminder



WG	Process	Physics	Detector	ECM	Who
Higgs & EW	H->bb	mass	JER, JES	500 GeV	Ali Ebrahimi (10%) + Junping Tian + NN
	ee->tautau	A_FB, tau-pol, A_LR	tau-reco	500 GeV	Daniel Jeans + NN
	H->mumu	BR	momentum resolution	500 GeV	Shin-ichi Kawada + NN
	H->invisible	BR limit	JER, hermeticity	500 GeV	Y. Gao + NN
	WW->qqlv	MW, TGCs, beam pol.	JES, JER, electron, mu	500 GeV	Kostiantyn Shpak, Justin Anguiano, Mila Pandurovic
	vvqqqqq	QGCs	JES / JER	1 TeV	Jakob Beyer + NN
	gamma Z->qq/ee/mumu	A_LR, sigma_tot, JES	photon, JER/JES, e, mu	500 GeV	Takahiro Mizuno + JT
Top, Bottom & CG	tt->bbqqqq	cross section, AFB	b-tag, vertex charge, PID	500 GeV	Sohail Amjad, Adrian Irlles, Yuichi Okugawa + RP, RY
	H->bb/cc/gg	BR	c-tag, b-tag, JER	500 GeV	Ryo Yonamine + Masakazu Kurata
BSM	low deltaM Higgsinos	natural SUSY	low-p tracking, PID, hermeticity	500 GeV	Swathi Sasikumar + JL/MB
	mono-photons	WIMPs / WISPs	photon reco, BeamCal	500 GeV	Ahmed Mustahid + RY
	Zh, mh < 125 GeV	limit on ZZh coupling	p res, e reco, JER, hermeticity	500 GeV	Yan Wang + JL/MB

More new names assigned to some NN's!
But some are supervisors rather than active analyzers, so certainly we need more active analyzers almost everywhere.

On-going actions

- To facilitate benchmark analyses, PCs are trying to*
- *enrich **confluence pages** for benchmark processes by including information on*
 - ***analyzers in charge** (the list has been updated)*
 - ***clear definitions of deliverables** (plots&numbers, together with those by cheated analyses)*
 - ***MC data requests** (being listed up)*
 - ***pointer to existing software asset***
 - *prepare an **analysis code repository** (see Remi's talk in the last S&A meeting)*
 - *monitor and help, if needed, individual benchmark analyses.*
 - *locate issues, if any, with the new MC samples together with analyzers.*



Webpages for Benchmarks

- <https://confluence.desy.de/display/ILD/Benchmarks+for+physics-driven+detector+optimisation>
- currently maintained by the physics WG conveners
- evolving
- will be handed over to responsible analysis persons later

The screenshot shows a Confluence page with a sidebar on the left containing a navigation menu. The main content area is titled "WIMPs in mono-photon channel" and includes sections for "Short description", "Main observables", "Optimisation deliverables", and "References".

Navigation Menu (Left Sidebar):

- ▼ Benchmarks for physics-driven :
 - A_LR, A_FB from $t \rightarrow bb$ qqq
 - Hadronic branching ratios of
 - Higgs mass from $H \rightarrow \gamma\gamma$
 - Low Delta(M) Higgses
 - Low mass extra Higgses in e
 - WIMPs in mono-photon cha
 - Branching ratio $H \rightarrow \mu\mu + \mu\mu$
 - Limit on $H \rightarrow$ invisible
 - Tau polarisation, A_FB, A_LR
 - W mass, TGCs, beam polaris
 - A_LR, JES calibration from e
 - QGCs $e^+e^- \rightarrow \nu\nu\mu\mu$
- > ILD Software Working Group
- > ILD Technical Working Group
- > ILD Meetings
- > ILD Management space
- > Tools
- > ILD notes and publications
- > Information

Space tools (Bottom Left)

Page Content:

Pages /... / Benchmarks for physics-driven detector optimisation

WIMPs in mono-photon channel

Carl Mikkel Berggren posted on 27. Mar. 2018 17:56h - last edited by Carl Mikkel Berggren on 09. May. 2018 10:23h

Short description.

The search is for pair-produced WIMPs, where the presence of the interaction is detected by the observation of an ISR photon and nothing else. At ILC (but not LHC) this kind of interaction can be described in a almost model-independent way with EFT. Apart from the obvious $ee \rightarrow \nu\nu +$ ISR irreducible background, also $ee \rightarrow ee$ (down the beam-pipe) + ISR are the backgrounds. No dedicated signal simulation is needed; one can simply reweight the $ee \rightarrow \nu\nu +$ ISR gamma-spectrum (as a function of theta and E_γ) to be that of any signal.

This benchmark in particular can probe two features:

- Photon detection and measurement.
- Hermeticity, in particular the performance of the very forward calorimeters.

Main observables.

The main (and only) direct observables for the signal is the momentum of the ISR photon. The physics observable is the exclusion/discovery WIMPs in the mediator-mass/coupling plane for different Lorentz-structures of the interaction.

Optimisation deliverables.

- Gamma detection efficiency at all angles, in all relevant calorimeters.
- Rejection power of the very forward calorimeters against other activity than the ISR.

People

Main investigator: Ahmed Mustahid, assisted by Ryo Yamamine

References.

Previous analyses by Christoph Daniels & al. : 'Characterising WIMPs at a future e^+e^- Linear Collider', [arXiv:1206.6636](#). Finishing study by Merz Habermehl & al. : 'WIMP searches at the International Linear Collider' [PoS\(ICHEP2016\)155](#), [arXiv:1702.05377](#)

No labels

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- ***For confluence pages:***
Analyzers, please get a DESY account, if not yet, and get write permission to corresponding confluence pages from Ties or Frank.
- ***For the analysis code repository:***
Analyzers, please get a GitHub account and let Jenny know the account information for analysis code repository.
- ***Reviewers for individual benchmark analyses are being nominated by PSB. Please cooperate with PSB if you are asked to serve as a reviewer.***

We strongly request all the people working on physics analyses to proactively contribute to the benchmark analyses for the new 500 GeV samples as much as possible!

Proposed S&A meeting schedule

Jun. 27: Akiya

Jul. 11: Akiya

Jul. 25: KF

Aug. 8: Jenny

Aug. 22: Frank

Sep. 5: Frank

Sep. 19: KF

***Weekly physics conveners' meeting every Tuesday
at 13:00 CERN time with no summer break***

Conveners' ML:

ild-physics-conveners@desy.de

Use this mailing list to send your talk request.

3-day Pre-meeting to LCWS in Arlington

Date: Oct. 19-21

Expected attendee:

- ***physics and software conveners***
- ***benchmark analyzers***
- ***benchmark reviewers***
- ***others***

Please book your flights accordingly!