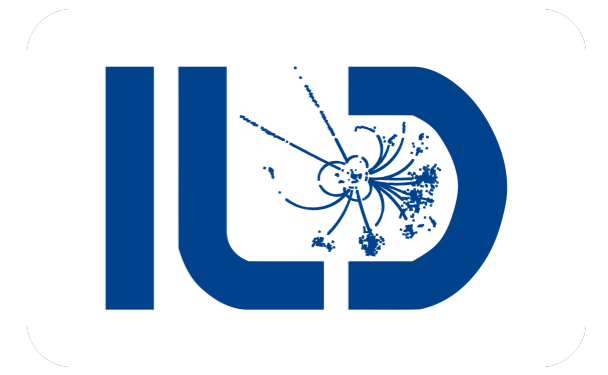




Physics Coordination Report

K.Fujii & J. List,
ILD General Meeting,
May 9 2018

MEXT Review - Reminder



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)

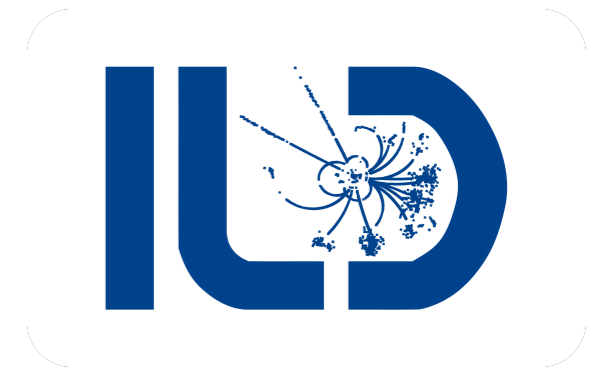
2nd meeting on Feb. 5

- Discussions in JAHEP on ILC250: 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)

MEXT Review - Update



4th meeting on April 13

- Hearings on the 2 projects mentioned in the LCB and ICFA statements:
 - **XFEL**: Katsuo Tokushuku (KEK/IPNS director)
 - **FAIR**: Ryugo Hayano (U. Tokyo, anti-matter exp. at CERN)

The WG members basically understood that these two projects are mentioned because they are **good examples of how to start international discussions**. The organization and management should be decided through international discussions, not by the host. They also understood that **the expected cost share of the host country of the ILC would be of a similar fraction to the XFEL and FAIR cases (~60%)**, if we apply the same principle used in the PIP to ILC250 that the host provides the land and the civil engineering part of the construction plus about 1/3 of the high-tech part of the accelerator.

- Discussions on a draft WG report:
 - **Many supportive opinions were expressed even from presumably neutral WG members** (working on neutrinos and other smaller size experiments). To make sure that the points made will be properly reflected in the next/last draft, **a written summary of the necessary modifications has been sent to the chairman and his deputy.**

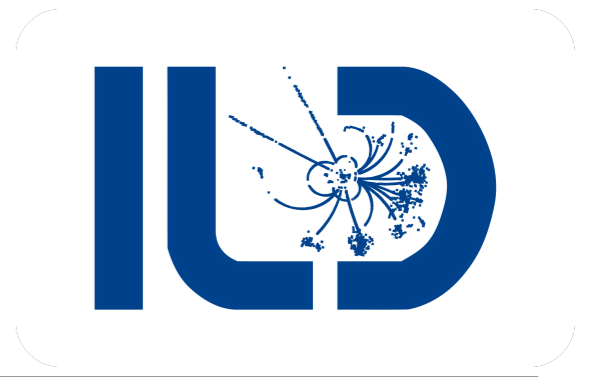
The 5th and presumably the last meeting of the Particle & Nuclear Physics WG will happen on

May 16, 2018

- ***Discussions to finalize a modified draft WG report.***

The 4th and presumably the last meeting of the TDR Validation WG will happen on the next day

May 17, 2018



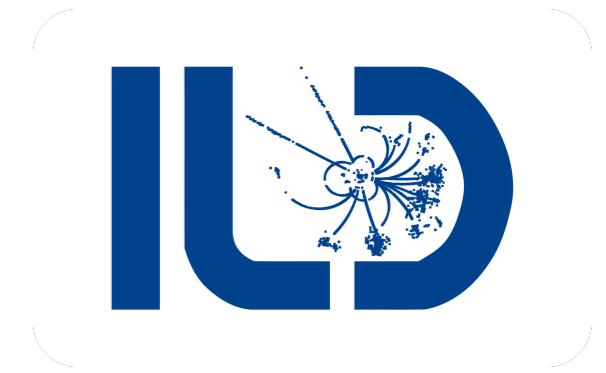
.... back to ILD matters

Physics Benchmarks - reminder



WG	Process	Physics	Detector	ECM	Who
	H->bb/cc/gg	BR	c-tag, b-tag, JER	500 GeV	NN + NN
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	Yu Kato + NN
	WW->qqlv	MW, TGCs, beam pol.	JES, JER, electron, mu	500 GeV	Kostiantyn Shpak + NN
	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	NN + NN
	Top, Bottom & QCD	tt->bbqqqq	x-section, AFB	b-tag, vertex charge, PID	500 GeV
BSM	low deltaM Higgsinos	natural SUSY	low-p tracking, PID, hermeticity	500 GeV	Swathi Sasikumar + NN
	mono-photons	WIMPs / WISPs	photon reco, BeamCal	500 GeV	Ahmed Mustahid + NN
	Zh, mh < 125 GeV	limit on ZZh coupling	p res, e reco, JER, hermeticity	500 GeV	Yan Wang + NN

Webpages for Benchmarks



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

A screenshot of a Confluence page titled "WIMPs in mono-photon channel". The page is part of a space named "Benchmarks for physics-driven detector optimisation". The page content includes a short description, main observables, optimisation deliverables, and references. The page is authored by Carl Mikael Berggren and was last edited on 09. May. 2018. The page is part of a space named "Benchmarks for physics-driven detector optimisation". The page content includes a short description, main observables, optimisation deliverables, and references. The page is authored by Carl Mikael Berggren and was last edited on 09. May. 2018. The page is part of a space named "Benchmarks for physics-driven detector optimisation".

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

WIMPs in mono-photon channel

Carl Mikael Berggren posted on 27. Mar. 2018 17:55h - last edited by Carl Mikael 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 $ee \rightarrow \text{nunu} + \text{ISR}$ 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 $ee \rightarrow \text{nunu} + \text{ISR}$ 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 Yonamine](#)

References.

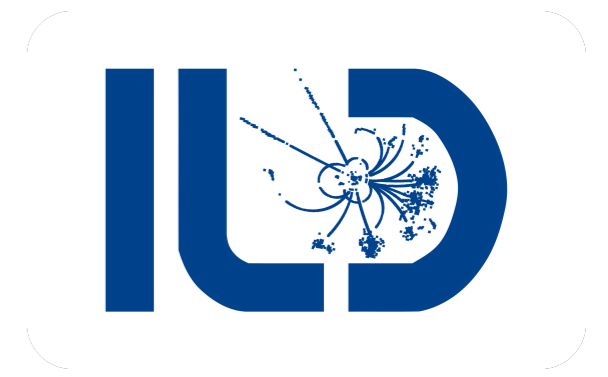
Previous analyses by Christoph Bartels & al. : 'Characterising WIMPs at a future e^+e^- Linear Collider', [arxiv:1206.6639](#). Finishing study by Moriz Habermehl & al. : 'WIMP searches at the International Linear Collider' PoS ICHEP2016 (2016) 155, [arxiv:1702.05377](#)

No labels

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Preparing AWLC



- **last sw/ana meeting before AWLC** is in two weeks from now: **May 23, 2 pm CERN time**
- no physics focus, solely AWLC preparation
- as usual, **any material to be shown at AWLC and not yet presented to ILD needs to be presented** at latest then! (but no full rehearsal talks)
- in addition, the ILD publication rules apply: “**Slides** for an oral presentation given on behalf of the ILD group should be available to ILD **at least two working days in advance of the presentation**”



Analysis post-meeting in Kyushu

- post-meeting slot on **Saturday June 2**
- physics conveners plan a working meeting of all people working on benchmark analysis to review in detail the status of each benchmark
- Keisuke & Mikael will organise this - stay tuned

Conference talks (ILD & LCC Physics WG)



- ICHEP: all 6 abstracts accepted
 - ILD:
 - bb / TGC: Sviatoslav Bilokin
 - Higgs to leptons: Daniel Jeans
 - light Higgs search: Yan Wang
 - LCC:
 - 250 GeV physics case/ Higgs EFT: Tomohisa Ogawa
 - Discovery potential: Mikael Berggren
 - Polarisation @ 250 GeV: Juergen Reuter
- Rencontres de Vietnam
 - same 6 abstracts submitted, waiting for news