



Report on ILD

Ties Behnke

02.10.2018

Today's Agenda



ILD group meeting

Tuesday Dec 4, 2018, 2:00 PM → 4:00 PM Europe/Zurich

Vidyo

Description To join the meeting please use the following link: <https://vidyoportal.cern.ch/join/mLqbrxo0hy>

Name of the meeting room: ILD_Misc

- | | | | | |
|----------------|-----------|--|-------|---|
| 2:00 PM | → 2:10 PM | Report by the spokesperson
Speaker: Ties Behnke (DESY) | 🕒 10m | ✎ |
| 2:10 PM | → 2:20 PM | The ILD contribution to the European Strategy Update Process
Speaker: Ties Behnke (DESY) | 🕒 10m | ✎ |
| 2:20 PM | → 2:35 PM | Report by the physics coordinator
Speaker: Keisuke Fujii | 🕒 15m | ✎ |
| 2:35 PM | → 2:50 PM | Report by the Software Coordinator
Speaker: Frank Gaede | 🕒 15m | ✎ |
| 2:50 PM | → 3:10 PM | Report from the infrastructure workshop at KEK
Speaker: Karsten Buesser (DESY) | 🕒 20m | ✎ |



Subdetectors: several successful beam tests in October/November:

- Vertex: CMOS detector at DESY
- TPC: new micromegas layout beam-tested in DESY
- Si-ECAL/SDHCAL: combined beam-test at CERN
- AHCAL: combined beam-test with CMS and tail catcher at CERN, full size ILD slabs built at DESY

Integration:

- KEK integration mini-workshop last week
→ progress on coil design and calo TESLA model mechanical simulations (see talk by Karsten later)

Background simulations:

- Stable and reliable parameter set found for GEANT low momentum tracking in beampipe
→ more details in software report.
- Evaluations of detector occupancies and of effect of anti-DID have to be restarted by subdetectors in contact with Daniel Jeans

IDR:

- (slow) regular progress on collection of information, editing of technical chapters will start in January
- Second draft of LCC PD R&D Liaison Report released

ILD 2019



- After the success of the benchmarking days in Arlington we propose to organise a second set of benchmarking days in February, to finalise the work towards the IDR
 - Feb 23-25, at KEK, details to be announced soon
- We propose to attach to this 1.5 days of general ILD discussions (Feb 26/27)
 - Discuss the political situation
 - Summarise the situation of the sub-detectors for the IDR
 - Discuss and work on the IDR
 - Discuss and work on the ILD roadmap for >2019



ILD ESU document



- 10 page document to describe ILD and the state of the collaboration
- Available on overleaf:
 - <https://www.overleaf.com/read/tqfjghmdjrzp>
- First version of the complete document is available
 - References are still missing
 - Figures are not yet all there nor final

Structure of the document



- I. Introduction
- II. History of the ILD detector concept
- III. The ILD detector design: requirements
- IV. Implementation of the ILD detector
 - A. Vertexing system
 - B. Tracking System
 - C. Calorimeter System
 - D. The Forward System
 - E. Detector Integration
- V. Science with ILD
- VI. Integration of ILD into the experimental environment
- VII. The ILD Collaboration
- VIII. Conclusion and Outlook
- References

Main philosophy:

- short, to the point
- Do not duplicate information already given in the other two ILC ESU documents
- Reliability and community are two main messages

Requirements



Physical Quantity	Measurement quantity	critical system	required performance
Decay length resolution	$\sigma_{DL} / \mu\text{m}$	Vertex Detector	$5\mu\text{m} \oplus 10\mu\text{m}/p(\text{GeV}/c)\sin^{3/2}\theta$
Momentum resolution	$\sigma(1/p_t)$	Tracking System	$2 \times 10^{-5}(\text{GeV}/c)^{-1}$
Jet Energy resolution	$\Delta E/E$ (rms ₉₀)B	Calorimeter, Tracker	3%

- Are the requirements still correct?
- Are there additional things we like to add to the table?

ILD structure



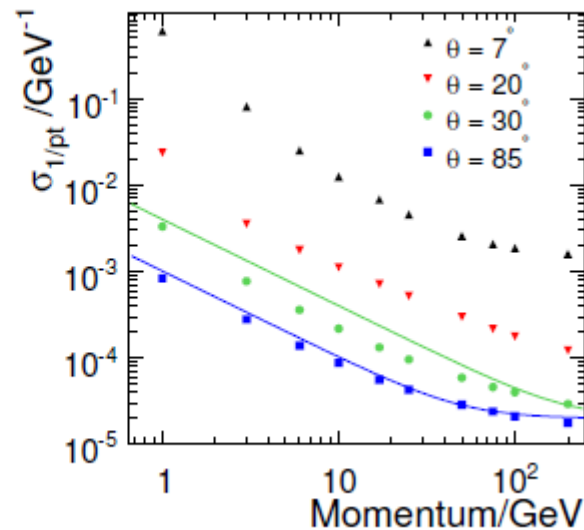
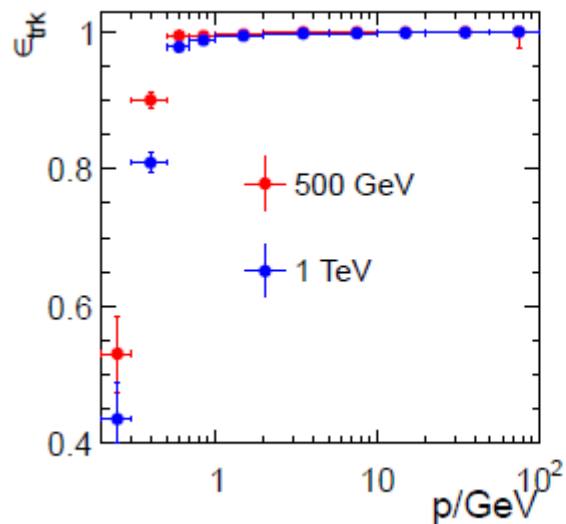
Technology	Detector	Start	Stop	comment
Pixel detectors	Vertex	16	60	3 double layers of Silicon pixel
	Forward tracking	220	230	2 Pixel disks
Silicon strip	SIT	153	300	2 layers of SI strip
	Forward tracking	250	371	5 layers of Si strip
	SET	1811	1900	2 layers of SI strip
Gaseous tracking	TPC	330	1808	MPGD readout, 220 points along the track
Silicon Tungsten Calo	ECAL option	1843	2028	30 layers of $5 \times 5\text{mm}^2$ pixel
	ECAL EC option	2450	2635	30 layers of $5 \times 5\text{mm}^2$ pixel
	Luminosity Calorimeter			
Diamond Tungsten calorimeter	Beam Calorimeter			
SiPM on Tile	ECAL option	1843	2028	30 layers, 5 mm strips, crossed
	ECAL EC option	2450	2635	30 layers, 5 mm strips, crossed
	HCAL option	2058	3410	48 layers, 3cm^2 pixels
	HCAL EC option	2650	3937	48 layers, 3cm^2 pixels
RPC	HCAL option	2058	3410	48 layers, $1 \times 1\text{cm}^2$ pixel
	HCAL EC option	2650	3937	48 layers, $1 \times 1\text{cm}^2$ pixel
SiPM on Scintillator bar	Muon	4450	7755	14 layers
	Muon EC	2560	7755	12 layers

Performance plots

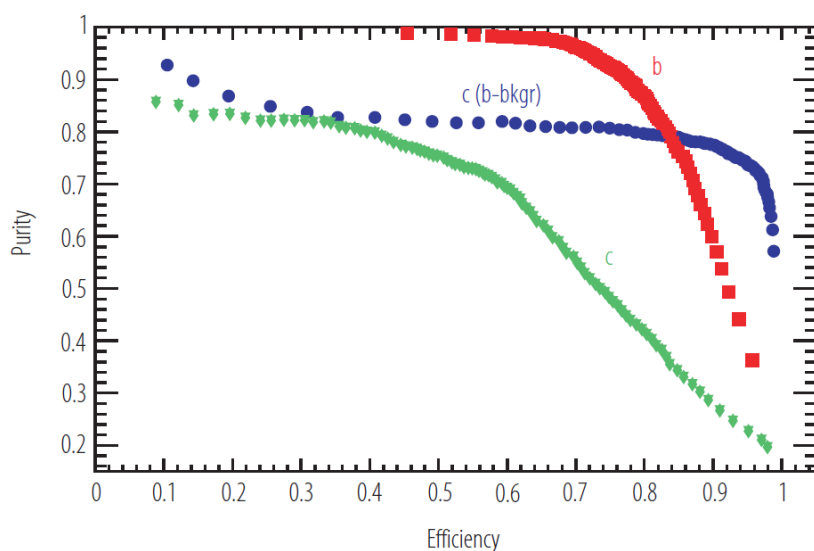


Tracking Performance

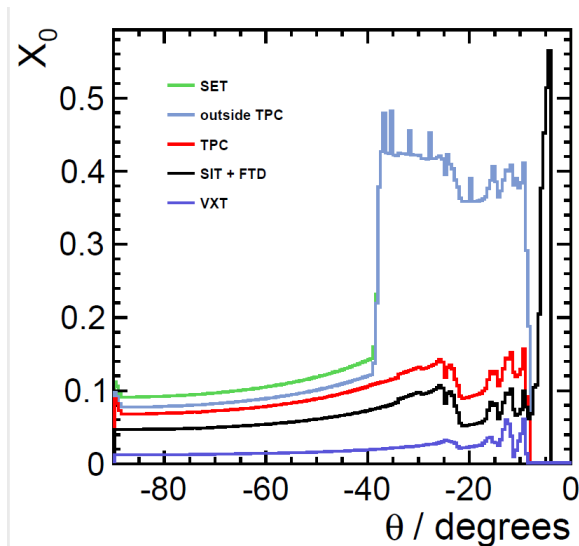
These are the old
DBD plots,
The new ones are
not citable yet..



Performance plots



B-tagging performance



Dead material in ILD

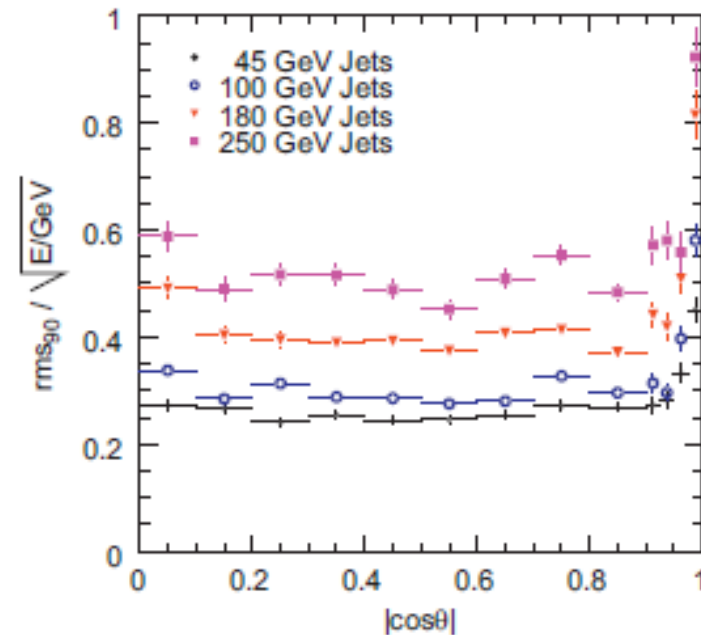
Performance plots



Particle flow performance

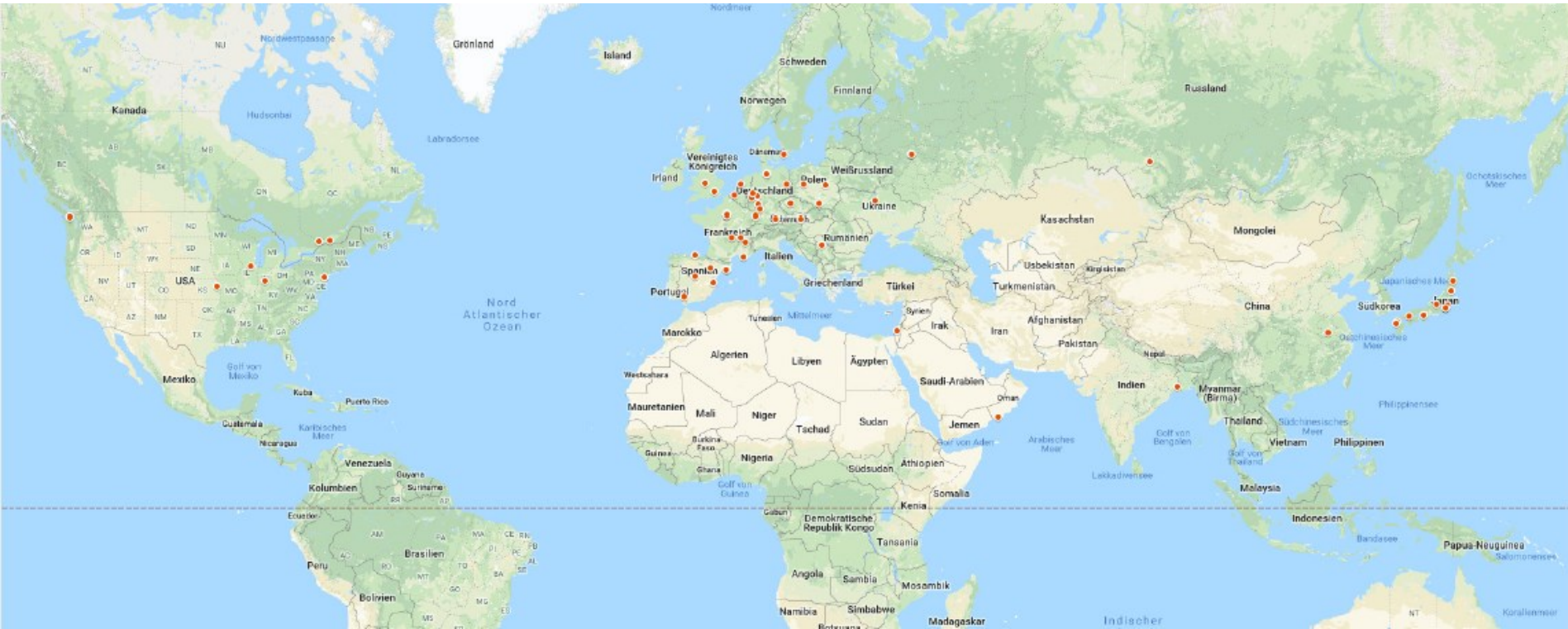
Taken from a publication
by the Cambridge group

Not the newest one, but the
newest citable one.



Particle flow: jet energy resolution

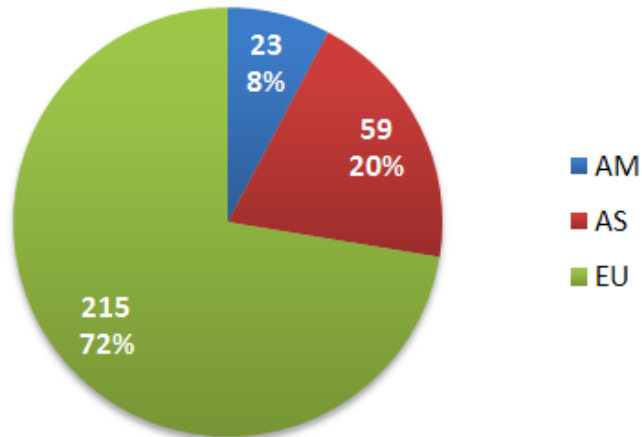
ILD collaboration



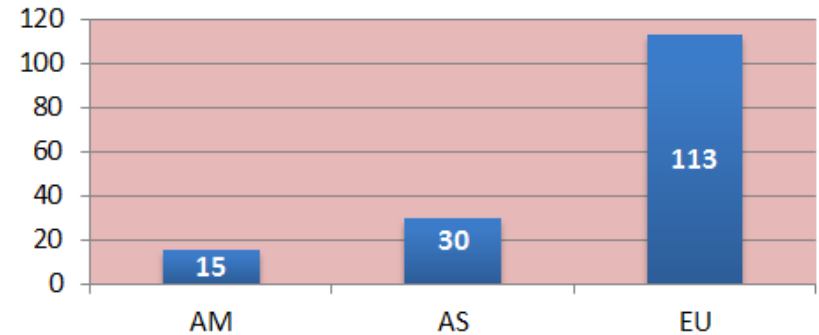
ILD Collaboration



members per region



scientists per region



(not (yet) in the document)

Next steps



- Please read the document, and comment
- Finalisation of references etc over the next days
- Final submission of the document on December 18 to the European Strategy