

SDHCAL activities dashboard

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IP2I (previously IPN) Lyon

June 17th, 2022

Hope you're doing well

Shanghai has ended lockdown beginning of June and has moved to partial lockdown few days ago. Hope the situation will continue to improve.

Ongoing activities

Test beam analysis

all TB

- Uniformity (on hold)
- Low Energy hadrons (Bing+SJTU+Lyon) Paper published
- Uses of BDT (Bing+SJTU+Lyon) Published.

09/2018 only

- SiWECAL+SDHCAL (Hector+CIEMAT : (done))
- Tricot electronics (GG, Imad (?) on hold (?))

2015 only

- Analysis with rotated device (Hector Note in preparation)

Ongoing activities

Hardware

- 2m² GRPC+HR3 ASU+ new DIF (Lyon+ CIEMAT)
- Timing electronics (CMS muon for strip and SJTU for SDHCAL pads): board design.
- Cooling for CEPC (SJTU)
- SJTU lab (SJTU)

Simulation

- ILD SDHCAL simulation/reconstruction performance monitoring (Camilo, CIEMAT)
- Tricot simulation (on hold)
- Timing in simulation (developments by Guillaume Garillot → Analysis by Imad+**Tunisian group**)
- Prototype simulation upgrade (Multithreading, CEPC version, ...) (François)

Ongoing activities

grid

- Learning how to run jobs on ILCdirac grid (Gérald)

PFA

- ArborPFA → APRIL (Bo, → GG).
- AMSTER : potential APRIL reclustering method (GG, on hold)
- Rand Index (GG, on hold)
- PFA with timing (IP2I, work in collaboration with LLR+IHEP)

Digitisation

- Incorporate GRPC response modelling to digitiser, (Clermont+Lyon).
- Evolution : tricot electronics, independence from Marlin (discussion started)

Ongoing activities

ILD/CEPC Analysis

- $e^+e^- \rightarrow Z \rightarrow \text{jets}$ then $e^+e^- \rightarrow ZH \rightarrow \text{jets}$ (CIEMAT)
- $e^+e^- \rightarrow \gamma\gamma VV$ (Bing did it for CEPC, Imad+ Guillaume for ILC)
- include FCC-ee also ?

September 2022 test beam preparation

Test beam confirmed date : September 14 to 28.

- Revamp DAQ : Laurent
- Raw data "streamout" revamping : François, Gérald
- Restart SDHCAL : 14 chambers have been tested for gas leak (around 2/3 are OK)
- MGRPC
- PID
- ...

AIDAinnova status

- AIDAinnova has started on April Fools' Day(April 1st 2021).
- Kick-off organised April 12-16, 2021
<https://indico.cern.ch/event/1003419>
- First year meeting just finished
<https://indico.cern.ch/event/1104064/>

AIDAInnova task 7.2

task 7.2 : Multigap RPCs (MRPC) for fast timing and Eco-friendly gas mixtures for RPCs

- Developing and testing material (thin plates of low resistivity glass)
- Construction, characterization and test beam of small-size prototypes
- Construction of $1 \times 1 \text{ m}^2$ prototypes with the new structure read-out plane for SDHCAL
- Test beam study of the shower time development in an SDHCAL, equipped with the prototype detectors
- Identification and characterization of new gas mixture candidates Validation of the gas mixtures after large integrated charges at GIF++

Deliverable 7.1: Characterization of the small size prototypes of MRPCs for fast timing and high rates in 24 months Mary Cruz representative

AIDAInnova task 12.5

task 12.5 : Particle Flow Reconstruction

- Advanced PFA algorithms for DUNE detectors using new readout technologies.
- PFA algorithm with particle ID for dual-readout calorimeters.
- **Optimised APRIL PFA algorithm for hadronic jets** (collaboration with Vincent Boudry, LLR).

Deliverable 12.4 New PFA prototypes (responsible Warwick university)
Improved and documented particle flow algorithms, including machine learning based algorithms, **available in the PandoraPFA toolkit**, suitable for new readout technology detectors.

Monthly meetings <https://indico.cern.ch/category/13510/>

A 3 days "Hackaton" June 21-23 : <https://indico.cern.ch/event/1148507/>

AIDAinnova kickoff

- WP3 : task 3.3 Sub-ns timing precision for EUDET, task 3.4 Common DAQ+monitoring (CERN mailing lists AIDAinnova-WP3@cern.ch)
- WP7 : task 7.2 5D SDHCAL, also eco Gas for RPC.
(AIDAinnova-WP7@cern.ch, AIDAinnova-WP7-general@cern.ch)
- WP8 : calorimeters (AIDAinnova-WP8-General@cern.ch)
- WP11 : electronics (includes some OMEGA chips)
- WP12 : software : task 12.3 ML techniques for shower simulation, task 12.5 PFA. (AIDAinnova-WP12@cern.ch)
- WP 13 : call for extra innovative projects, deadline mid july :
<https://indico.cern.ch/event/1003419/contributions/4273255/attachments/2226853/3772291/AIDAINNOVA-210415-krizan.pdf>

Published papers I

- SJTU+Lyon work : JINST 14 (2019) no.10, P10034
<http://inspirehep.net/record/1762795>.
- CHEF 2019 proceedings :
 - JINST 15 (2020) 05, C05016. <https://arxiv.org/abs/2002.09678>
 - JINST 15 (2020) 05, C05022.
<https://inspirehep.net/literature/1826123> 7 pages document available only on journal website.
 - There were 3 SDHCAL talks at CHEF 2019
- BDT paper
 - **Published**, D. Boumediene et al 2020 JINST 15 P10009.
<https://inspirehep.net/literature/1790235>
 - Preprint at <https://arxiv.org/abs/2004.02972>
 - The mismatch between the paper and the CHEF 2019 proceeding is fixed in inspireHEP, in HAL and in CERN CDS
(<http://cds.cern.ch/record/2715408> and
<http://cds.cern.ch/record/2743482>)
- Energy reconstruction from 3 GeV to 80 GeV using BDT

Published papers II

- Accepted by JINST <https://inspirehep.net/literature/2035601>
- preprint at <https://arxiv.org/abs/2202.09684>

Publications

Papers, short term

- Djamel SDHCAL RPC response simulation , CALICE Paper034
EB=Chadeeva, Sicking, white, collaboration review finished ?

Notes in preparation

- Bo: APRIL PFA (on hold, **Bo got a position in a chinese university**)
- Hector : analysis with rotated devices.
- GRPC uniformity from test beam data (on hold).

Coming meetings

Recent workshops

- CALICE collaboration meeting , April 20-22, Valencia, <https://agenda.linearcollider.org/event/9571/>
- FCC week, May 30- June 3, Paris, <https://indico.cern.ch/event/1064327/>

Coming workshops

- 3rd CEPC Workshop EU Edition, May 4-7, Marseille, **postponed to spring 2022 !!!!!** <https://indico.in2p3.fr/event/20053/>
- LCWS 2022 in spring ?
- Seattle Snowmass Summer Study 2022, July 17-26, <http://seattlesnowmass2021.net/>

Coming conferences

Past

- Pico-second timing detectors, September 9-11, 2021 Zurich, Switzerland, <https://indico.cern.ch/event/861104/>.
- Also one talk given to IEEE conference (Imad) end of 2021 (?).
- CALOR2020 → CALOR2021 → CALOR2022, May 16-20 2022, Sussex, UK, <https://indico.cern.ch/event/847884/>
- PISA meeting on Advanced Detector 2021, May 22-28 2022, Elba, Italy, <https://www.pi.infn.it/pm/>

Abstract closed

- ICHEP 2022, July 6-13, 2022, Bologna, Italy, <https://www.ichep2022.it/>. 3 CALICE talks
- TWEPP2022 (Topical Workshop on Electronics for Particle Physics), Bergen, Norway, September 19-23, <https://twepp2022.w.uib.no/>

2 talks

- "Status of Timing-SDHCAL Development",
<https://indico.cern.ch/event/847884/contributions/4831346/>,
speaker : Weihao Wu (SJTU) ?
- "Energy reconstruction with the Semi-Digital HCAL",
<https://indico.cern.ch/event/847884/contributions/4831298/>,
speaker : Imad

Coming conferences (more)

RPC2022 is at CERN overlapping with the end of our test beam. Any abstract on MGRPC, updated electronics to provide ?

Open to abstract

- RPC 2022, CERN, 26-30 September 2022
<https://indico.cern.ch/event/1123140/> Abstract open up to 07/01/2022
- ACAT 2022, Bari, Italy, 24-28 October 2022
<https://indico.cern.ch/event/1106990/> Abstract open up to 06/30/2022
- PIC 2022, 5-9 September 2022, Tbilisi, Georgia.
<https://indico.cern.ch/event/1158815/> Abstract up to 08/19/2022

Coming conferences (more)

postponed conferences

- HEPChile2021, January 4-8 2021, Valparaiso, Chile,
<https://indico.cern.ch/event/698387/> (**POSTPONED** to 2022)

Announced date

- Lepton Photon 2023, July 17-21 2023, Melbourne, Australia,
<https://indico.cern.ch/event/1114856/>
- EPS-HEP 2023, August 21-25 2023, Hamburg, Germany.
<https://www.eps-hep2023.eu/>

ILC Analysis tutorials

- ILC analysis with Delphes and miniDST, June 23, 2021, 3:30pm, online, <https://agenda.linearcollider.org/event/9264/>
- Introduction to iLCSoft, July 21, 2021, 3:30pm, online, <https://agenda.linearcollider.org/event/9272/>
- Jet flavor identification with LCFIPlus, August 18, 2021, 3:30pm, online, <https://agenda.linearcollider.org/event/9318/>
- SGV - fast simulation October 13, 2021, 3:30pm, online, <https://agenda.linearcollider.org/event/9394/>
Simulation à Grande Vitesse works on ubuntu 20 only
- MarlinKinFit, May 18, 2022, 3:00 pm, online, <https://agenda.linearcollider.org/event/9687/>

Request from CALICE

News from autumn 2019 CALICE Meeting

- Message from Roman. Clean/update the CALICE twiki page.
<https://twiki.cern.ch/twiki/bin/view/CALICE/SdHCal>

ILD regular meetings

ILD collaboration starts discussion over its strategic stance related to future collider projects regarding the vanishing perspective for ILC.

ILD strategy discussion

- Part I (CEPC and FCC-ee), March 1st
<https://agenda.linearcollider.org/event/9623/>
- Part II, March 22, <https://agenda.linearcollider.org/event/9624/>
- Part III, April 5, <https://agenda.linearcollider.org/event/9625/> :
Exclusion of Russian institutes from DESY and ILDC, FCAL status
- Part IV, April 19 <https://agenda.linearcollider.org/event/9626/> :
status of gaseous trackers.
- Part V, May 3, <https://agenda.linearcollider.org/event/9695/> :
ECAL status
- Part VI, May 17, <https://agenda.linearcollider.org/event/9708/>
status of SI trackers.

ILD regular meetings (II)

ILD strategy discussion (II)

- Part VII, June 7, <https://agenda.linearcollider.org/event/9709/>
HCAL status

ILD Analysys/software meeting June 8th

- <https://agenda.linearcollider.org/event/9726/>
- τ reconstruction methods
- Next meeting June 22nd

FCC meetings

FCC-ee physics performance meeting

- Category <https://indico.cern.ch/category/12894/>

FCC physics meetings

- Category <https://indico.cern.ch/category/5307/>
- Next meeting not planned.

FCC Higgs performance meeting

- May 23rd, <https://indico.cern.ch/event/1161222/>

CEPC meetings

next CEPC days June 29th

- <https://indico.ihep.ac.cn/event/16906/>

CEPC accelerator review

- The first CEPC International Accelerator Review Committee Meeting will be hold on June 7th to (17th ?)
- <https://indico.ihep.ac.cn/event/16801/>
- agenda : <https://indico.ihep.ac.cn/event/16801/program>

CEPC workshop

The 2022 International Workshop on the High Energy Circular Electron Positron Collider <https://indico.ihep.ac.cn/event/17020/> 0Ctober 24-28

IDT WG3 Physics meeting

Open meeting

- November 11th <https://agenda.linearcollider.org/event/9351/>
- December 16th <https://agenda.linearcollider.org/event/9352/>
- January 13th <https://agenda.linearcollider.org/event/9353/>
Canceled
- February 10th <https://agenda.linearcollider.org/event/9354/>
- March 10th <https://agenda.linearcollider.org/event/9355/>
- April 14th <https://agenda.linearcollider.org/event/9356/>
- May 12th <https://agenda.linearcollider.org/event/9357/>
- June 9th <https://agenda.linearcollider.org/event/9680/>
- September 15, October 13, November 17, December 15

MC mass production files

situation

- Overlay bug corrected MC production. Samples have been produced :
 - single muons and K_L^0 : <https://ild.ngt.ndu.ac.jp/eelog/dbd-prod/467>
 - inclusive higgs decay of qqH process :
<https://ild.ngt.ndu.ac.jp/eelog/dbd-prod/468>

Local production VIDEAU geometry

- Simulated uds sample from 30 GeV to 600 GeV on ilcDirac
`/ilc/user/g/ggrenier/prod/v02-02-03/uds/sim/ILD_I2_v02/`
- Simulated single klongs from 5 GeV to 100 GeV on ilcDirac
`/ilc/user/g/ggrenier/prod/v02-02-03/single/klong/sim/`

Snowmass 2021 restarted

Snowmass process has restarted

Full process

- Snowmass day, September 24, 2021
<https://indico.fnal.gov/event/50538/>
- Next event : summer meeting 2022, July 17-26, 2022
<https://indico.fnal.gov/event/22303/>

Energy frontier workshop

- Restart, September 2021 <https://indico.fnal.gov/event/49756/>
- Next event : March 28, April 1, 2022
<https://indico.fnal.gov/event/52465/>

Snowmass 2021 (previous items)

- American particle physics strategy update
- Currently discussed in all future collider projects.
- ILD preparation : LOI, simplified ilcsoft, delphesLC card
<http://ilcsnowmass.org/>
- Energy Frontier workshop was held July 20-22
<https://indico.fnal.gov/event/43963/overview>
- Process planning meeting Oct 5-8,
<https://indico.fnal.gov/event/44870/overview>

Snowmass 2021 and CALICE

Input for the Instrumentation Frontier

<https://snowmass21.org/instrumentation/start>

- Dominant themes for calorimetry : High granularity, Dual Readout, PFA, timing
- CALICE has submitted not 6 but 10 proposals
<https://agenda.linearcollider.org/event/8647/>
 - **Timing-SDHCAL (Imad)**
 - Generic R&D on timing layer in calorimeters (Frank Simon)
 - Scintillator Strip ECAL
 - SiW ECAL
 - Common compact readout for CALICE calorimeters (for ILD option 1) (Katja, Roman, Taikan)
 - AHCAL (Katja, Felix)
 - High granularity crystal ECAL.
 - DHCAL (José).
 - ALICE FoCal improved.
 - New sensors for SiW ECAL.

News from our data

Our data on DIRAC will need to be moved : IP2I end of grid support

- Our test beams data have been transferred from grid catalogue LFC to DIRAC catalogue and to CERN eos.
- CERN files on EOS have been copied in 2018 from NAS or recently from the path LFC → DIRAC → CERN eos.
- Checksum on files : CERN eos files that were on LFC are identical to those in DIRAC and LFC except for 6 files.
- These 6 files were copied in 2018, they are identical between LFC and DIRAC (likely they were badly transferred to LFC)
- These 6 files are from SPS_AugSep2012 (DHCAL_715572.I0_0.slcio, DHCAL_715572.I1_0.slcio, DHCAL_715572.I2_0.slcio, DHCAL_715572.I3_0.slcio, DHCAL_715573.I0_0.slcio, DHCAL_715651.I0_0.slcio)
- The test beam data in LFC have been deleted.

Outlook

Flash info

- Energy reconstruction with BDT paper accepted by JINST
- Test beam at CERN SPS, september 14-28

Don't hesitate to add any important activity, paper, or conference, I may have miss.

Next meetings

Imad teaching duties on Thursday mornings from february 3rd to may 12th.

Should we move meeting back on Thursday or keep it on Friday ?

Europe (summer) 9-11 / China 15-17 / Korea 16-18

Assuming meeting is still on Fridays

- Friday June 24th (Test beam preparation)
- Friday July 1st (regular+Test beam preparation)
- Friday July 8th (?), July 15th (?), July 22nd
- Summer break (?)

Backup

Past meetings

- LCWS2019, October 28 - November 1 2019, Sendai,
<https://agenda.linearcollider.org/event/8217/> : one talk by Bo on APRIL PFA
- CEPC workshop, November 18-20, IHEP, Beijing,
<https://indico.ihep.ac.cn/event/9960/>, a SDHCAL talk by Bing.
- CHEF2019, November 25-29, Kyushu,
<https://indico.cern.ch/event/818783/> 3 talks (Bing, GG, Djamel)
 - PID with Boosted Decision Tree (Bing)
 - Digitizer (Djamel)
 - APRIL PFA (GG)
- RPC2020, February 10-14, Roma,
<https://agenda.infn.it/event/19942/> **No abstract submitted**
- Spring 2020 CALICE meeting, March 4-6, McGill
<https://agenda.linearcollider.org/event/8343/overview> Very little SDHCAL presence (2 persons)
One talk by Mary-Cruz

Past meetings (II)

- FCC France, May 14-15, By video,
<https://indico.in2p3.fr/event/20792/>
- CALICE analysis meeting, May 20
<https://agenda.linearcollider.org/event/8526/> (one talk by Hector)
- CALICE analysis meeting, July 30, 2020
<https://agenda.linearcollider.org/event/8585/> (one talk by Bing)
- CALICE Collaboration meeting, Sept 28-30, 2020
<https://agenda.linearcollider.org/event/8608/>
- AWLC 2020 (Americas Workshop on Linear Colliders), October 19-22, online
<https://conf.slac.stanford.edu/awlc2020/>
- FCC workshop, November 10-13, 2020, online
<https://indico.cern.ch/event/932973/>
- CALICE analysis meeting, December 10, online
<https://agenda.linearcollider.org/event/9005/>

Past meetings (III)

- IML Machine Learning Workshop, June 2-5 2020, CERN, **POSTPONED to October 19-22** <https://indico.cern.ch/event/852553/> **Lots of potentially interesting talks**
- CPAD Instrumentation Frontier Workshop 2021, March 18-22 (overlap LCWS) <https://www.stonybrook.edu/cfns/cpad2021/index.html> (abstract up to 02/28/2021)
- LCWS Europe, March 15-19, 2021, online <https://indico.cern.ch/event/995633/> **2 talks accepted, April 16 at 11:20 pm and 18 at 11:20 am.**
- CALICE meeting, March 24-26, 2021 online <https://agenda.linearcollider.org/event/9076/overview>
- Workshop on gas transport, April 22, online, <https://indico.cern.ch/event/1022051/overview> **Numerous talks on high GWP gas replacement**
- TIPP 2020 → TIPP 2021, online, May 24-28, 2021 <https://indico.cern.ch/event/981823/> One talk on tricot electronics <https://indico.cern.ch/event/981823/contributions/4295341/>.

Past meetings (IV)

- ILD meeting, June 3-4 2021, online,
<https://agenda.linearcollider.org/event/9199/>
- ECFA Higgs at ee collider meeting, June 18, 2021
<https://indico.cern.ch/event/1033941/>
- EPS-HEP 2021, online, July 26-30,
<https://indico.desy.de/event/28202/>. **One CALICE talk**
- CALICE Analysis meeting, June 30, 2021 online,
<https://agenda.linearcollider.org/event/9265/>
- FCC week 2021, June 28-July 2, 2021 online.
- PIC 2020, September 14-17 **2021**, Aachen, Germany,
<https://pic2020.physik.rwth-aachen.de/>
- Higgs 2021, October 18-22, 2021, Stony Brook, NY, USA,
<https://indico.cern.ch/event/1030068/overview>. **fully online**
- ILCX2021 : "ILC workshop on potential experiments", October 26-29, 2021,
Tsukuba, Online, <https://agenda.linearcollider.org/event/9211/>.

Past meetings (V)

- ACAT 2020 (Advanced Computing and Analysis Techniques in Physics Research) → ACAT 2021 November 29-December 3, 2021, Daejeon, South Korea, <https://indico.cern.ch/event/855454/>
- Lepton Photon 2021, January 10-14, 2022, Manchester, UK, <https://www.leptonphoton2021.org/>
- PANIC 2020 → PANIC 2021 September 5-10 2021, Lisbon, Portugal, <https://indico.lip.pt/event/592/> One SDHCAL talk, proceeding published <https://inspirehep.net/literature/2035972>
- 2021 CEPC international workshop, November 8-12, online <https://indico.ihep.ac.cn/event/14938/>
- FCC Physics, Experiments & Detectors workshop in Liverpool, February 7-11, 2022, <https://indico.cern.ch/event/1066234/>
- Vienna Conference on Instrumentation 2022, February 21-25, 2022, Vienna <https://vci2022.hephy.at/>