SDHCAL activities dashboard

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IP2I (previously IPN) Lyon

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Hope you're doing well

Coronavirus outbreak

- Europe (Belgium, France, Spain) : back to some kind of confinement.

Ongoing activities

Test beam analysis

all TB

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

09/2018 only

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

2015 only

- Analysis with rotated device (Hector)

Ongoing activities

Hardware

- $2m^2$ GRPC+HR3 ASU+ new DIF (Lyon+ CIEMAT)
- Timing electronics (CMS muon for strip and SJTU for SDHCAL pads): Board design, first results expected in december.
- 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 $\rightarrow$ Analysis by Imad)
- Prototype simulation upgrade (Multithreading, CEPC version, ...) (François)

Ongoing activities

grid

- Transferring SDHCAL data from file catalogue LFC to DiracFC (Gérald)

PFA

- ArborPFA $\rightarrow$ APRIL (Bo, $\rightarrow$ GG, on hold)
- Rand Index (GG, on hold)
- PFA with timing (Bo+Imad)

Digitisation

Incorporate GRPC response modeling to digitiser, (Clermont+Lyon).

ILD/CEPC Analysis

- $e^+e^- \rightarrow Z \rightarrow$ jets then $e^+e^- \rightarrow ZH \rightarrow$ jets (CIEMAT)
- $e^+e^- \rightarrow \gamma\gamma VV$ (Bing)
- include FCC-ee also ?

AIDAinnova status

- AIDAinnova invited to Grant preparation
- Anticipated project start date on next April Fools' Day (April 1st 2021).
- Kick-off meeting planned for April 12-16, 2021

Work Packages

- PFA (ARTIC) : 50 k€(was EOI #145), in WP 12 Software, task 12.5, deliverable 12.4 (quite generic : provide working PFA)
- SDHCAL + electronics : 50 k€(was EOI #57 and EOI #58), in WP 7 Gaseous detectors for frontier science, task 7.2 and deliverable 7.1 (50 k€, Mary Cruz representative)

SDHCAL removed from high granularity calorimeter WP

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 1×1 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

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.

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.

Published papers

Recent

- 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)

Publications

Papers, short term

- Bing Current analysis of test beam data on low energy hadrons (direct CALICE paper, no note).

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).

Papers, medium term

- More on GRPC response modeling by Clermont ?

Coming meetings

Recent workshops

- 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/

Coming workshops

- 3rd CEPC Workshop EU Edition, May 4-7, Marseille, POSTPONED to spring
  2021 https://indico.in2p3.fr/event/20053/

Coming conferences

Abstract closed

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Open to abstract

- HEPChile2021, January 4-8 2021, Valparaiso,Chile,
  `https://indico.cern.ch/event/698387/` (POSTPONED to 2022)
- CALOR2020 → CALOR2021, May 17-21 2021, Sussex, UK,
  `https://indico.cern.ch/event/847884/` (abstract 12/7/20 to
  03/26/21)
- TIPP 2020, May 24-29, British Columbia, Canada, CANCELED
  `https://indico.cern.ch/event/864722/` (abstract up to 04/24/20)
- PANIC 2020, POSTPONED August 30 - September 3 2021, Lisbon, Portugal,
  `https://indico.lip.pt/event/592/` (abstract will reopen in 2021)
- PIC 2020, POSTPONED `https://pic2020.physik.rwth-aachen.de/`

More specialized meetings

Electronics

- Pico-second timing detectors, July 1-3, Zurich, Switzerland, `https://indico.cern.ch/event/861104/`, POSTPONED to June 16-18 2021

Advanced software

- IML Machine Learning Workshop, June 2-5, CERN, POSTPONED to October 19-22 `https://indico.cern.ch/event/852553/` Lots of potentially intersting talks
- ACAT 2020 (Advanced Computing and Analysis Techniques in Physics Research) September 8-12, Daejon, South Korea, POSTPONED to end of 2021 `https://indico.cern.ch/event/855454/`, abstract up to 04/07/2020

Request from CALICE

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

ILD regular meetings

ILD group meeting November 10th

- https://agenda.linearcollider.org/event/8959/
- ILD management renewal ongoing.
- Talk on Higgs/top/EW EFT parameters fit.
- Status of the SiW-ECAL
- next meeting December 8th
  https://agenda.linearcollider.org/event/8970/

ILD regular meetings (continued)

ILD Analysys/software meeting November 18th

- https://agenda.linearcollider.org/event/8980/
- A long writeup for Snowmass to assemble the full ILC story : deadline June 2021.
- MC production and disk space (see next slide).
- A Very interesting talk on jet error. In Pandora, each neutral cluster is assumed to be a neutron and enters Jet reconstruction with the neutron mass.
- A talk on analysis $e^+e^- \rightarrow Z'H$ with $H \rightarrow ZZ^\star$
- Next meeting December 2

MC mass production files

situation

See slide 4 of Frank's talk
(https://agenda.linearcollider.org/event/8980/contributions/
46833/attachments/36103/56142/gaede_sc_report_20201118.pdf)

- REC files : keep 10% but 500 files max.
- SIM files : keep all files until space is nearly full, then do not keep any more sim file for the remaining of the MC production.

Our needs

- We want to keep at least keep ZH and $\nu\bar{\nu}H(\to WW)$
- Are these already produced ? (see Frank's talk and
  https://ild.ngt.ndu.ac.jp/elog/dbd-prod/)
- Likely to send a mail to Frank to assure these are kept.

Snowmass 2021

- American particle physics strategy update
- Currently discussed in all future collider projects.
- ILD preparation : LOI, simplified ilcsoft, delphesILC 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 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 $\rightarrow$ DIRAC $\rightarrow$ 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 ready to be deleted.

Outlook

Flash info
- BDT paper published.
- Bing PhD defense tomorrow.

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

Next meetings

Europe (winter) 9-11 / China 16-18 / Korea 17-19

- December 3rd (Europe winter time)
- December 17th
- End of year break, reconvene in January.

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)