ILD Physics Analysis strategy

SDHCAL meeting

C. Carrillo, M.C. Fouz, H. García

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Recent Meeting

- Last **ILD group meeting** 02/06
  https://agenda.linearcollider.org/event/8540/
  - ILD Guest membership, interested?
  - Good news from Japan. US very intereted ILC in japan.
  - Encouraging studies for even higher energy 1TeV.
- Last **ILD Analysis/Software meeting** 03/06
  https://agenda.linearcollider.org/event/8548/
- Last but one **ILD Analysis/Software meeting** 20/05
  https://agenda.linearcollider.org/event/8533/
  In this meeting we requested the MC samples to run the SDHCAL validation.
  Details about the MC production in our Twiki Page
  https://twikiae.ciemat.es/twiki/bin/view/ILC/PHYSICSDataAnalysis
  Hector has done a local copy (in CIEMAT)
  /pool/calice3/data/MonteCarlo/sdhcal_validation/

Ongoing activities

- SDHCAL validation for 250GeV (reporting in next ILD software and Analysis meeting).
- SDHCAL Incident angle studies.
- **Physics Analysis**

Choosing a physics analysis (from previous meeting)

- Among the physics channels we have mentioned, we are open to both options: $H \to c\bar{c}$ or $H \to \tau\tau$.
- H $\to \tau\tau$ (Daniel Jeans). https://agenda.linearcollider.org/event/7371/contributions/37895/attachments/30993/46405/LCWS16_higgscp.pdf
- Recent publication (Jeans,Wilson) on CP of tau leptons pairs https://arxiv.org/pdf/1804.01241.pdf
- CMS: http://cms-results.web.cern.ch/cms-results/public-results/publications/HIG-17-034/index.html,
- ATLAS: http://cms-results.web.cern.ch/cms-results/public-results/publications/HIG-17-034/index.html

Learning jet/dijet physics object

- Neither $H \to \tau\tau$ or $H \to c\bar{c}$ seem to fullfill SDHCAL-team expectatives.
- We have understood that any analysis where the SDHCAL is relevat would have to involve jets/dijets.
- While a final descion for the analysis is taken we decided to try to get knowledge in this topic.
- Very interesting presentation from Adrian Irles on this topic (attached). With the other calorimeter (AHCAL).
- Since he has expresed interest in working toguether with us we can try to team up with him and do similar study with (SDHCAL).
- We could compare in the dijet perspective the performance of the two calorimeters.

Backup

The tools we have learned.

In the framework of the SDHCAL test-beams data analysis we have learned:

- How to work in the ILCSoft analysis framework. (Installed in CIEMAT running in dedicated nodes)
- Run from scratch a simulation using the standard sequences in the framework and switching from one scneario to another (large $\rightarrow$ small), (AHCAL $\rightarrow$ SDHCAL), etc.
- Navigate and run over the centrally produced datasets (DIRAC)
- Produce ntuples out of the samples for detector/physics analysis. (AIDA,REC,SIM)
- Use reconstructed physics objects and produce event cut flows for analysis.
- Event display, etc.

The tools we have learned

Private CIEMAT-SDHCAL pion gun simulation for comparison with TB-2018.