LAPP au CAF

24 Novembre 2024

Team by January 2025

- **Composition of the team**
  - 11 (~7,5 effective FTE) physicists with permanent position / 7 post-docs / 7 PhD
  - Post-docs funded by Labex , ANR, ERC, IN2P3
  - ~17 (~11 FTE) engineers in mechanic, electronic, online and Grid

- **Involvement of the team in computing**
  - Physicist : S. Jezequel (10% on spare time) : Site support+CAF
  - Engineers : Site operation (share of MUST platform to ATLAS) :
    - F. Chollet will retire in march 2026 being replaced by M. Gauthier-Lafaye as MUST technical responsible
    - WLCG should avoid non-converging tools (last example : Tockens)

- **Involvement in software**
  - LAr : online + firmware
    - O. Arnaez (CPJ USMB), M. Delmastro,
    - F. Bellachia, S. Lafrasse, J. Jacquemier (arrivée 01/12/24), E. F. Rasambatra (CDD CPJ), N. Chevillot
  - ML on tracker (ANR, 1 postdoc + 1 PhD) will finish by end 2025

LAPP-T2 infrastructure for pledge 2024-2025

- 40 Gb/s external connexion was set in production in 2024
  - In time for the 2024 Data Challenge
  - Next target is 100 Gb/s connexion hopefully for 2026 data challenge

- « Grid » resources (pledge 2025 bought and being deployed)
  - storage = Pledge 2025
    - Deployed : 7.5 PB (-0,8 +1,3 = 0.5 PB)
    - Objective : 10 PB for HL-LHC (by 2028?)
  - computing = 65 k Hep-Spec06 in 2025 (+ 10 k)

LAPP-T2 infrastructure non-pledge in 2024-2025

- Other « grid » resources
  - storage = 150 TB LAPP_LOCALGROUPDISK (out of warranty recycled GRID storage).
    - Possibility to increase by 300 TB each year
  - computing = 0

- Other local (lab, university) resources
  - Local batch resources also shared with Grid
    - Very efficient to start jobs
  - Few interactive machines shared within laboratory

Analysis activity/requirements (1)

Global remark : Run-2 analysis still finishing / Run-2 + Run-3 starting
→ More storage sps/LOCALGROUPDISK will be necessary to cope with both

Multiboson analysis (VBS WZ and Zy)

Team : O. Arnaez, L Di Ciaccio, I. Koletsou, E. Sauvan, A. Carneli (Post-doc CPJ 2024-2026), L. Boudet (PhD 2023-2025), M. Dubau (PhD 2023-2026), P. Ziakas (PhD 2024-2027)

- Use dAOD stored on sps (small format) and LOCALGROUPDISK (bigger format)
  - Centralised management for sps for SM group
  - Stuck with non increasing sps space over last years : 70 TB
  - Recurrent minimal requirement of 90 TB
- In 2024, processed on CCIN2P3 batch (choice between LAPP and CC adapting to effective availability and reliability)
- 2025 : start Run-3 analysis

Analysis activity/requirements (2)

Single Higgs / HH

Team : M. Delmastro, N. Berger, Z. Wu (Post-doc IN2P3), K. Oleksii (Post-doc IN2P3)

- sps usage : 12 TB
- In 2024: HH→yybb partial Run 3 analysis, Photon ID for diHiggs
  - Most of the analysis done on lxplus / EOS (shared ntuples)
- 2025:
  - HH→yybb EFT interpretation (private samples to be generated, batch for fitting: used CC for previous EFT interpretations, might move part of the workflow there)
  - Full Run 3 HH→yybb design (ML Photon ID, use of increased Run 3 dataset with EasyJet ntuples - usually on EOS, might migrate part of the workflow to CC / sps)

ML Tracking : ACTS

Team: Jessica L. , F. Castillo (Post-doc ANR ATRAPP 2023-2025), J. Couthures (PhD)

- sps usage : 33 TB

Analysis activity/requirements (3)

SM : Drell-Yan

Team : T. Hryn'ova (ERC DITTO) + her ERC team

- Post-doc : D. Lewis, N. Brahimi, R. Balasubramanian
- PhD : T. Cavaliere (PhD 22-25), M. Zumbihl (24-27), T. Duong (24-27)

Subjects :Drell-Yan ee/mumu/tautau + b-jets

- Tried to use IN2P3-CC_PHYS-SM for storage of ntuples + jobs on CERN batch
  - Pros:
    - Lots of space available (350 TB as of January 2023)
    - Replication capability (i.e. no need to download)
  - Cons:
    - Remote interactive access, whilst it could be considered a "pro" is actually slow and very inefficient
    - CERN batch always very busy and more prone to failed jobs with the remote access
    - Ultimately, running of all systematics/variables/selections was too inefficient and resulted in warnings from CC-IN2P3 admin
    - Moved to UChicago Analysis Facility to profit from available disk storage and local batch for 2024
- SPS usage currently marginal but new request for 10 TB for Run 3 analyses

Calibration activity/requirements

E/gamma

Electrons

- Team : N. Brahimi
- PhD : M. Zumbihl (24-27), T. Duong (24-27)
- Use GPU for optimization of DNN algorithms for electron triggers: training DNN requires 2 GPUs with approximately 100GB of RAM and ~ 1 T of inputs on SPS

Photons

- Team : M. Delmastro + M2 intern (PhD in 25-28)
- Explore ML approaches to correct shower shapes (in synergy with electron studies), e.g. optimal transport, might need GPU for training

B-tagging

- Team : Z. Wu, M. Delmastro
- All b-tagging calibration performed at CERN on lxplus since Alma9 needed and only CentOS7 available when we began (it could be migrated to CC since September, still not done)