# LPNHE Paris

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# Team by end 2023

**Composition of the team**

→ ***team: 6 EC - 10 CNRS – 14 IT (6.4 FTE) on ITK & HGTD***
***– 2 IT (0.8 FTE) on grid – 4 postdoc – 6 PhD (+ 4 co-direction)***

→ ***analyses:***

Higgs boson : channels with b-jets, diHiggs + Jet/Etmiss perf.
DM research : related to Higgs (monoHiggs), ALPs (prompt vs LLP) + egamma perf.
Top quark : mass/b-fragmentation
Jets : inclusive jet and dijet x-sec, sub-structure (Lund-jet plane) + JES/JER perf.

**Involvement of the team in computing (based on OTP pages report)**

~ 1.5 FTE constant since several years
Staff IE/IR: 1IR+1IE GRIF-LPNHE (0.8 FTE Class 4)
Staff physicist: CAF+FR-cloud (0.45 FTE C3) + GRIF-LPNHE (0.1 FTE C4)
shift computing (0.17 FTE C2)

**Involvement of the team in software (based on OTP pages report)**

1.24 FTE, was 0.37 FTE in 2022, 1.28 FTE in 2021
Staff physicist: upgrade ~0.2 FTE, detector ~0.84 FTE, reco/analysis ~0.40 FTE
⇒ increase mostly due to work of 1 post-doc

# Computing resources in 2023-2024

**Pledged Tier 2 grid resources**

- storage = 1910 TB (**+4% wrt 2023**)
- computing = 20350 HS23 (i.e ~2300 cpu) (**+18% wrt 2023**)
- network : 20 Gbps ⇒ expect 40 Gbps soon (already written last year!)

**Other non pledged grid resources**

- storage = 600 TB in LOCALGROUPDISK
- computing >10000 HS23 through fairshare of GRIF-LPNHE site

**Other local (lab, university) resources**

- local storage : ~50 TB attached to local server (ceph)
- local computing : 1 group server with 16 cores (32 in hyperthread),
- cloud : ~300 cores bought in summer 2021 for all lab
  - for service (e.g Itk production DB), computing (to be done)
  - for Juypterhub (to be more used !)
- high performance computing :
  - several actors/resources nearby at universities but not easy to use

# Analysis and needs

**Detector studies (local/CERN)**

→ pixels & HGTD studies : resource level and usage similar to last year
⇒ ITk LocalDB done on IJCLab & LPNHE cloud resources

**Performance studies (local/CERN/CC-IN2P3/GRID)**

→ jets & b-tagging studies : resource level and usage similar to last year

**Analyses studies (local/CERN/CC-IN2P3/GRID)**

→ Higgs studies : resource level and usage similar to last year
→ Top studies : local + use of CC-IN2P3 batch/sps

**Analyses using Machine Learning / GPU**

→ egamma perf : NN for online electron filtering, cross-talk,
calibration : done of GPUs at CC-IN2P3 and Brasil cluster
→ Jet perf : jet calibration with NN (QT of L. Boggia) done on CERN GPU
→ Unfolding studies (A. Butter, B. Malaescu) : on GPUs CERN+Heidelberg
→ asked for 2 months-GPU use at CC-IN2P3 farm in 2023
but used much more ... See talk by E. Purcino Desouza this afternoon
⇒ request of 4 months-GPU for 2024

# Near future

**Activities of the team**

→ evolution: stable in the 2 coming years

**Resources and needs**

→ next ‘Accord labo-LCG’ for WLCG is important

→ limited amount of computing ressources locally (not counting grid)

→ effort in laboratory for ML/IA in the coming years: training etc.
- Jupyterhub available at LPNHE since June 2023
- continuation of e/gamma-like ML studies by other/new students done in part at CC-IN2P3 and also in Brasil computing resources
- Jet & unfolding studies to be done also at CC-IN2P3 ?

→ needs for HGTD production database, deployed where ?

→ needs for storage/computing at CC-IN2P3
(as reported to CAF in September) : same in 2024 as in 2023

# LPNHE software involvement

Information taken from *OTP report*
Software involvement = 0.37 FTE S&C+AS = 0.17 FTE)
(Core=0, Upgrade=0.20, Data/Detector=0.02, Ana/Reco=0.15)

**Itk: 0.20 FTE (Upgrade=0.20) [S&C+AS=0]**

| Name | OTP | Activity | System | Task | FTE |
|---|---|---|---|---|---|
| F. Derue | C3 | Detector Operation | General Task | Phase-II ITk Pixels (Production DB, cloud) | 0.20 |

**Pixel detector: 0.02 FTE (Data/Detector=0.02) [S&C+AS=0.02]**

| Name | OTP | Activity | System | Task | FTE |
|---|---|---|---|---|---|
| G. Calderini | C3 | Computing/Software | Pixel | Software Development/Maintenance and Physics Performance | 0.05 |

**Reco/Ana: 0.15 FTE (Reco/Ana=0.15) [S&C+AS=0.15]**

| Name | OTP | Activity | System | Task | FTE |
|---|---|---|---|---|---|
| B. Malaescu | C3 | Computing/Software | General Task | Analysis Model Group | 0.15 |

**Other (ACTS etc ...) : FTE**

| Name | OTP | Activity | System | Task | FTE |
|---|---|---|---|---|---|
| | | | | | |

# LPNHE computing involvement

Information taken from *OTP report*
Total computing involvement = 1.47 FTE (0.12 C2, 0.45 C3, 0.90 C4)
(also LCG-FR)

## Class 2 : 0.12 FTE

| Name | OTP | Activity | System | Task | FTE |
|---|---|---|---|---|---|
| Sophie Trincaz-Duvoid | C2 | Computing/Software | General Tasks | ADCoS Senior shifts | 0.07 |
| Mélissa Ridel | C2 | Computing/Software | General Tasks | ADCoS Senior shifts | 0.05 |

## Class 3 : 0.45 FTE

| Name | OTP | Activity | System | Task | FTE |
|---|---|---|---|---|---|
| Frédéric Derue | C3 | Computing/Software | General Tasks | Cloud Operation & Management / Cloud squad | 0.45 |

## Class 4 : 0.90 FTE

| Name | OTP | Activity | System | Task | FTE |
|---|---|---|---|---|---|
| Aurélien Bailly-Reyre | C4 | Computing/Software | General Tasks | FR GRIF, Paris | 0.30 |
| Frédéric Derue | C4 | Computing/Software | General Tasks | FR GRIF, Paris | 0.10 |
| Victor Mendoza | C4 | Computing/Software | General Tasks | FR GRIF, Paris | 0.50 |