APC Paris

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for the APC team

ATLAS France CAF-PAF meeting
21st November 2023

Team

Composition of the team

→ *team: 1 EC - 2 CNRS - 5 PhD (2 cotutelles) - 1 post-doc*

→ *(current) analyses/activities:*

- *Higgs boson:*
  - *Search for double Higgs to bb+2 photons and bb+tau (-> Higgs boson self-coupling) – legacy Run2 papers (submitted or soon to be submitted) + preparation of Run3 analysis*
- *Pixel radiation damage simulation in Athena; ITk digitisation software development*

Involvement of the team in computing

→ *ADCOS shifts shifts computing*

→ *Analysis Release shifts*

Staff IE/IR: 0
Staff physicist: 0.20
Students: 0.02

Involvement of the team in software

→ *egamma derivation software development and group production*

→ *Pixel and ITk software*

Staff IE/IR: 0
Staff physicist: 0.72
Students: 0.32

Computing resources in 2022-2023

« Grid » pledged resources in 2022

- storage = 0 TB in 2022 (will increase by 0% in 2023)
- computing = 0 HS06 in 2022 (will increase by 0% in 2023)

Other « grid » resources *(if available, correspond to non pledged resources)*

- storage = 0 TB i.e LOCALGROUPDISK in 2022 (will increase by 0% in 2023)
- computing = 0 HS06 in 2022 (will increase by 0% in 2023)

Other local (lab, university) resources *(whatever is non grid)*

- HPC cluster "DANTE" available at APC: 640 CPU (Intel Xeon Gold 6230 2.1GHz 20C/40T), 2.3 TB RAM, divided in 16 nodes. 160 TB BeeGFS
- local team server (28 core, 512 GB RAM, Nvidia Quadro GV100, 20 TB HDD)

Analysis and needs

HH(bbtautau) full Run2 legacy paper

→ contribute to category optimisation (based on BDTs) + modelling studies

→ model: DAOD -> CxAOD (smaller, calibrated DAOD produced centrally by analysis group) -> ntuples

→ time to process: CxAOD->ntuples: ~1-2 days; BDT optimisation: ~1h/training, typically need to do hundreds of training for different values of hyperparameters, performed in batch (~12 hours)

→ where this analysis is mostly performed: grid (DAOD->CxAOD) + CERN (CxAOD->ntuples) + CC-IN2P3 (BDT optimisation on ntuples)

→ good points/difficulties/needs/expectations: CC-IN2P3 has very good performance (batch system and storage), supporting team is very helpful. Difficulties: Most of our tools don't support slurm, so we had to adapt the code to slurm, which was very annoying, Needs and Expectations: nothing special (analysis of Run3 data only starting now..)

Analysis and needs

HH(bbyy) full Run2 legacy paper

→ contribute to category / fit / systematic uncertainty studies
→ model: DAOD -> MxAOD (smaller, calibrated DAOD produced centrally by analysis group) (around 10 TB) -> ntuples (700 GB) -> fits
→ time to process: DAOD->MxAOD can take several days; MxAOD->ntuples: ~1 day (data + MC nominal + MC syst.)
→ where this analysis is mostly performed: DAOD->MxAOD on GRID; MxAOD->ntuples: CERN batch running on ntuples stored on /eos
→ Good points/Difficulties/Needs/Expectation: nothing in particular (analysis of Run3 data only starting now..)

ITk radiation damage simulations

→ simulate radiation damage and extract maps of electric field, use in dedicated simulation tool to extract weights to correct nominal ATLAS simulations to model effect of rad. damage
→ use Silvaco IN2P3 software license (token hosted on CC-IN2P3 license server) and run the software on local machine @APC

Near future

Activities of the team

→ *Continue activities on di-Higgs analyses + ITk software (digitisation & radiation damage)*

Resources and needs

→ *not clear yet as migration to Run3 analysis model (phys/physlite) for our analysis is only in its infancy*

Details on Computing involvement

Information taken from *this link*

Total software involvement = 0.22 FTE

Name	OTP	Activity	System	Task	FTE
Gregorio Bernardi	C2	Computing/Software	General Tasks	ADCoS	0.10
Ang Li	C2	Computing/Software	General Tasks	Analysis Release Shifts	0.02
Giovanni Marchiori	C2	Computing/Software	General Tasks	Analysis Release Shifts	0.10

Details on Software involvement

Information taken from *this link*
Assuming 2nd semester will give same OTP as 1st semester
Total computing involvement = 1.04 FTE

Name	OTP	Activity	System	Task	FTE
Marco Bomben	C3	Computing/Software	PIXEL	Software Development/Maintenance and Physics Performance	0.36
Marco Bomben	C3	Computing/Software	Upgrade	ITk - ITk Offline Software	0.04
Keerthi Nakkalil	C3	Computing/Software	Upgrade	ITk - Pixel Offline Software	0.24
Romain Bouquet	C3	Computing/Software	General Tasks	Analysis Model Group	0.08
Giovanni Marchiori	C3	Computing/Software	General Tasks	Group activities	0.30
Giovanni Marchiori	C3	Computing/Software	Upgrade	ITk - ITk Offline Software	0.02