

Plans of “charm+beauty” subgroup for 2021

Achim Geiser, DESY Hamburg

Nur Zulaiha Jomhari, Josry Metwally, Yewon Yang, DESY Hamburg



QCD meeting, 14.01.2021

- Welcome Yewon!

Continues work on charm cross sections, in particular at **13 TeV**, and **charm fragmentation fractions -> study nonuniversality**

- **Nuha**: finish thesis soon. Core result: **double differential and total charm cross section at 7 TeV**, 2010 data -> publish paper.

- **Josry**: finalize results on **5 TeV** for **charm and beauty cross sections**, with particular focus on **charm/beauty separation** -> write up, and publish paper.

- other activities:
 - project with **UERJ group** (and Uni-HH theory, B. Kniehl) on **MuOnia + D meson** production and **double-parton scattering**
 - **nanoAODplus**, make it real with **Z+Jets subgroup**
 - **summer student projects**

Charm analysis

- 7 TeV pp 2010 D^* : $\sim 3 \text{ nb}^{-1}$, finalize systematics and publish paper
- 5 TeV pp 2015 D^* : $\sim 30 \text{ nb}^{-1}$, finalize c/b separation, finalize analysis and publish paper
- 0.9 TeV pp 2010 D^* : ready to go, look for **bachelor/master student**
 - possibly ask for **recording more 0.9 TeV data** during 2021 LHC preparation runs
- 13 TeV pp Run 2: $\sim 4 \text{ pb}^{-1}$, (B Parking + ZeroBias, 2017/18; 2×10^{11} pp collisions !)
 - activate use of D^0 (already in ntuple), add reconstruction of D^+ , D_s , Λ_c
 - improve **miniAOD** treatment for D^* **slow pions** down to 100 MeV (avoid need of AOD)
 - make large **MC requests**

+ supporting studies for **UERJ MuOnia+D analysis** (we have accounts in Rio, they will get accounts at DESY, they process Charmonium and MuOnia samples and generate MC, we process B Parking and ZeroBias, we use each other's ntuples)

+ preparatory studies for **other (multi)muon + (multi)D meson + W/Z final states, QCD instantons?** (next PhD project, whenever valence arises: Z+charm)

Combine charm studies with Z+jet studies? (new, next-to-next project?)

-> when using nanoAODplus, combine Z+jets studies from Z+jets subgroup with charm meson tag from charm subgroup (complement ongoing work in V+jets group), Delta-R association of D mesons with jets.

Data preservation and Open Data: nanoAODplus legacy data format for Run 1

Achim Geiser, Physics planning meeting, 20.4.20

Reminder

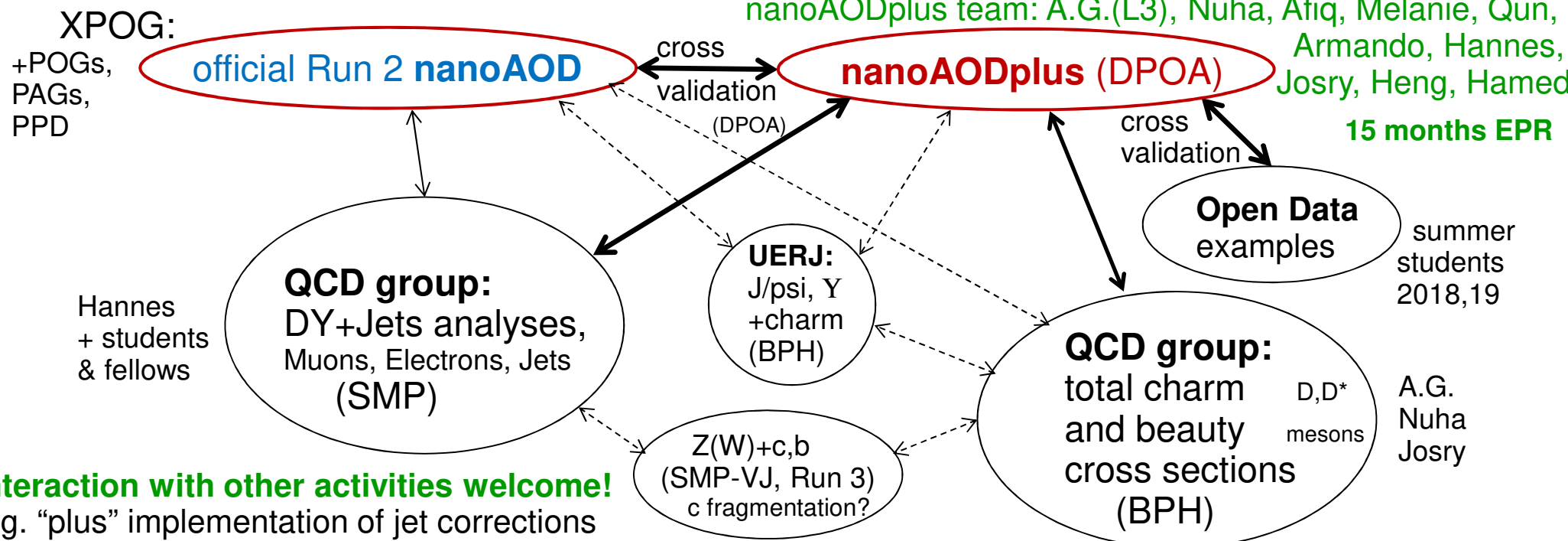
nanoAOD (created from miniAOD) is **currently advocated** and future default **format for Runs 2 and 3**.
~20% of analyses use nanoAOD so far, many enhanced by additional information **from miniAOD**.

Run1: miniAOD does not exist -> create **nanoAODplus** format directly **from AOD**,
functionally consistent with **nanoAOD**; **plus** additional AOD variables and extensions

monthly meetings

nanoAODplus team: A.G.(L3), Nuha, Afiq, Melanie, Qun, Armando, Hannes, Josry, Heng, Hamed

15 months EPR



20.04.2020

A. Geiser, physics planning meeting

Synergy with nanoAODplus activities

- Can we “officially” set up a project for **combined analysis of DY+jets data from Run 1 nanoAODplus and Run 2 nanoAOD ?**
- DPOA plan: **produce first “official” Run 1 nanoAODplus version within next few months**
-> focus on data sets needed for Z+jets analysis?
Which? DoubleMuon, DoubleElectron, SingleMuon, SingleElectron 2011/12 ?
UL nanoAOD v8 for Run 2 available (produced by PPD ☺)
- Potential **summer student project: Produce combined Higgs->4 lepton plot from CMS Run 1 (nanoAODplus) + Run 2 (nanoAOD) + ATLAS 2016 (nanoAODplus)** with **same** Root script (also synergy with PUNCH4NFDI),
“public” version with CMS Run 1 and ATLAS 2016 only (still interest in Jupyter notebook?)
- Potential **summer student project:**
J/psi and D meson plots in ZEUS, CMS, LHCb and ALICE data with same Root script
 - CMS: use previous summer student setup, plus “derivative” from UERJ project on Run 1 nanoAODplus
 - LHCb educational D^0 already interfaced to nanoAODplus (previous summer student project)
 - interface ZEUS data (muons and D mesons) (synergy with PUNCH4NFDI)
 - interface ALICE Open Data (D mesons, 10% of 2010 data)

Other synergies?

Your ideas are welcome !!!