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# PWG2 software status and analyzing real data

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# Outline

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- **PWG2: new code and status of the existing code**
  - Code status and feedback from subgroups
  - Coverity status
- **PWG2 in the Central Analysis Train**
  - Train composition
  - Challenges
- **Feedback from running on GRID and CAF**

# RSN package status

- ❑ Added:
  - new values for computations
  - possibility to build single-track plots for monitoring
- ❑ Currently in good shape
  - 0 compilation warnings
  - almost all and coverity warnings fixed, waiting inputs from authors of some classes for some slightly complicated ones
- ❑ Event-mixing working
  - waiting for the support to manage appropriately physics selection and (eventually) tender reworking on mixed event  
→ will be ready soon
- ❑ No major modifications

# PWG2/FORWARD code status

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- New FMD analysis codebase in PWG2/FORWARD/analysis2 with heavy clean-up and reorganization
- Add centrality and flow analysis code
- Correction objects for 900GeV, 7TeV pp, and 2.76TeV Pb-Pb committed
- Code working well and used for analysis of both pp and Pb-Pb
- Coverity reports and code conventions addressed

# PWG2/SPECTRA code status

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- Many update to the analysis code, mainly to support the analysis of 7 TeV and PbPb data
- New tasks for V0 analysis
- Develop tasks for ITS sa and Hadron PID analyses (to be included in the central PWG2 train)
- Coverity and rule checker reports addressed

# PWG2/EBYE code status

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- Added extensive set of analysis classes for charge and multiplicity fluctuations analysis
- Maintenance of the Long-Range Correlations analysis code

# PWG2/EVCHAR code status

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- Added a set of classes for the multiplicity analysis (First Physics PbPb paper)
- Added classes for Glauber fit analysis
- Added support classes which produce data for the AliCentrality object in the ESD
- AliCoverity and rule checker reports addressed

# current status flow software

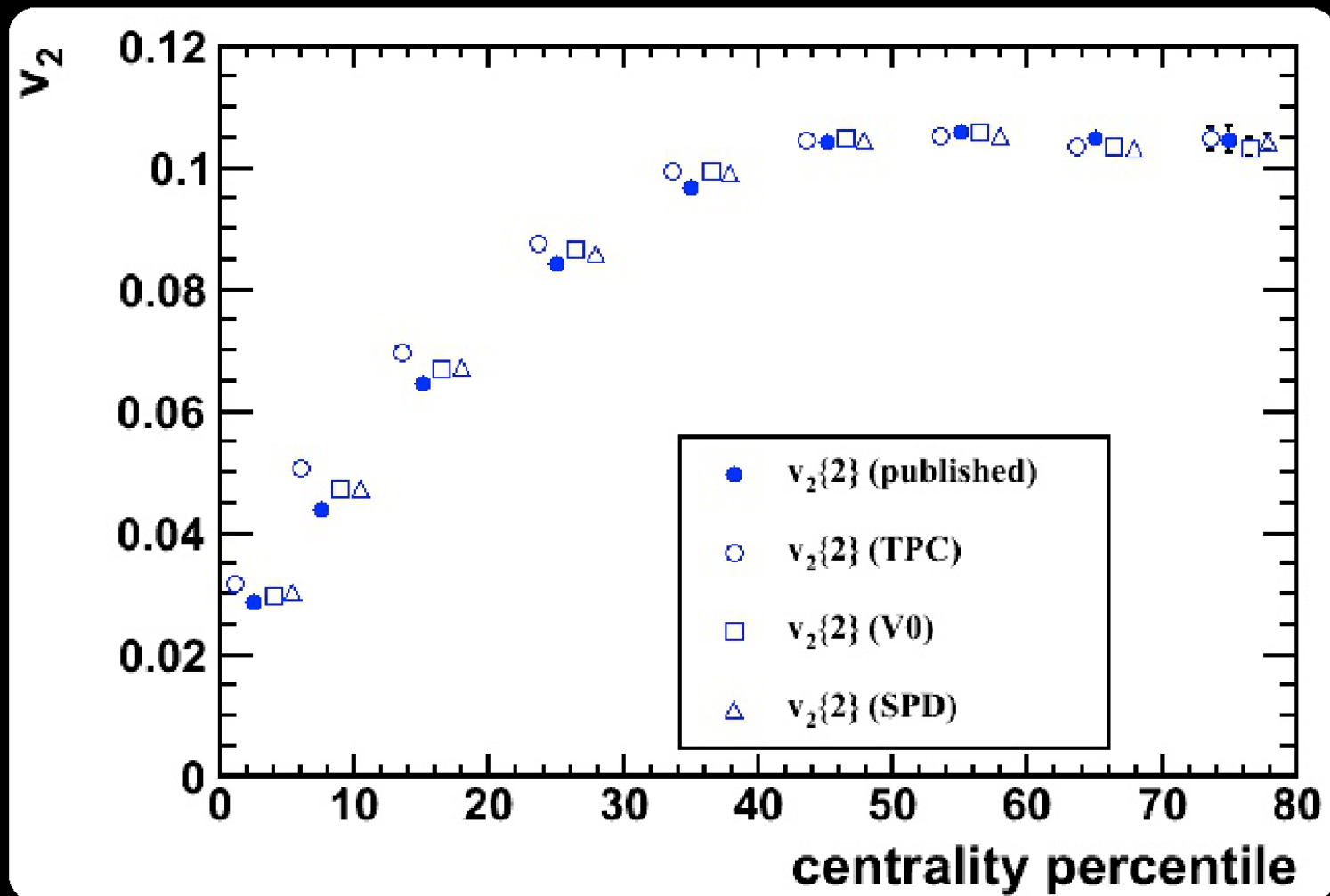
1. Finishing two papers
  1. other harmonics
  2. identified particle flow (we use ESD's with tender TOF and TPC)
2. Software
  1. included hooks for PMD
  2. included V0
3. Issues: centrality and outliers



# centrality

- recently TPC centrality selection in centrality framework has shifted: does not agree with published results anymore and also not with results from the other centrality estimators
  - we see a clear shift in the multiplicity selected  
~50 tracks

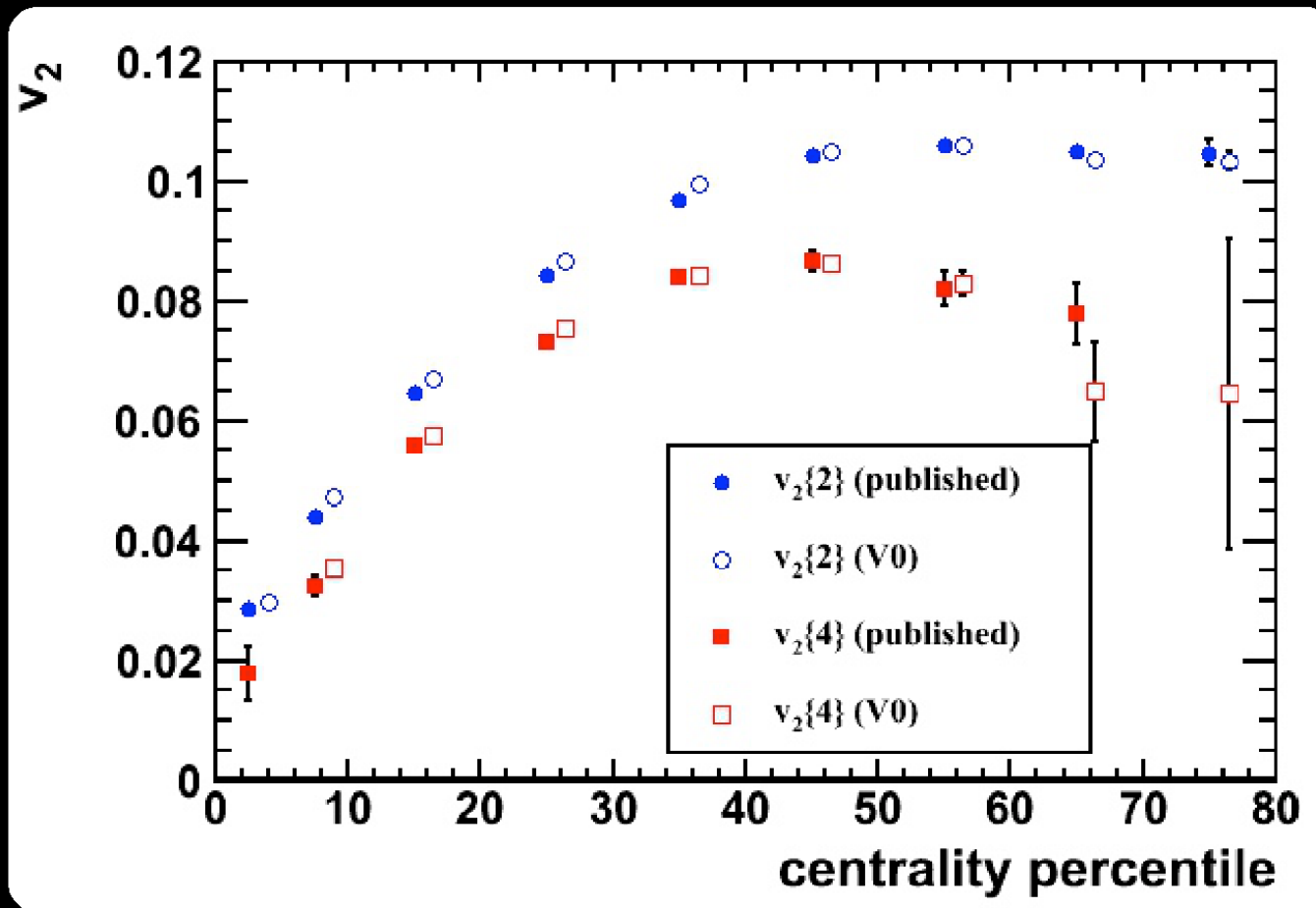
# centrality



most recent centrality selection

TPC clearly is different

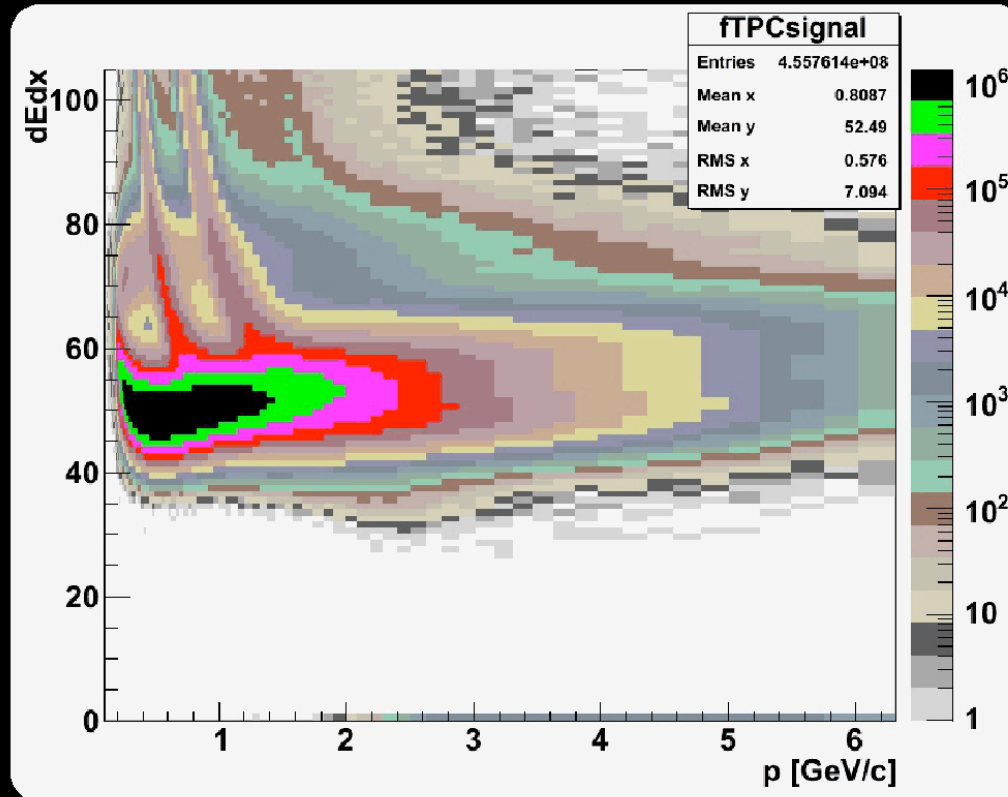
# centrality



most recent centrality selection  
V0 still seems ok

# outliers

most recent cuts do not remove outliers  
we apply our own  $5\sigma$  cuts



we remove also laser tracks which are in the sample by a  $dE/dx$  cut (they are well separated in  $dE/dx$ , they pass all other normal track cuts)

They are laser tracks during warm-up which are not removed, a cut will be added in the future to the official selections

**R. Snellings**

# Code status (FEMTO/UNICOR)

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- **FEMTO**
  - Move to the AliCentrality for centrality selection in PbPb (V0 and SPD methods for now)
  - Improvements for PID specific analysis using the TOF information
  - Update the AOD support in preparation for the central analysis train
- **PbPb “first physics” paper prepared on the GRID**
  - Many runs on the GRID – stable operation
  - Significant issues with two-track effects found, should be corrected in pass2 (test productions promising)
- **All AliCoverity reports resolved**

# Framework usage (AliFemto/UNICOR)

- Code extensively used on GRID in preparation of the two ALICE papers on femtoscopy: pp large statistics and PbPb first physics
- New analysis involves analysis of the data vs. multiplicity and pair momentum
  - Significant memory footprint of the output histograms, limit of one job per one or two multiplicity bins
  - Execution time grows quadratically with multiplicity: limits number of files/job, multiplicity bins in one run

Memory: 60 x 60 x 60 x 4 x 4 x 2 x 6 x 10 = 414 M

3D histogram  
60 bins/axis

Signal, background  
+ weights

pi+  
pi-

6 kT  
bins

10 bins in  
centrality

# AliCoverity status

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- PWG2 has 37 pending coverity reports (17 major, 18 moderate, 2 minor)
- Effort ongoing in all PWG2 subgroups to address all the remaining reports
  - EVCHAR: 8 reports
  - SPECTRA: 8 reports
  - FORWARD: 5 reports
  - EBYE: 6 reports
  - RESONANCE: 6 reports
  - FLOW: 4 reports

# PWG2 central train

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- Preparations for the PWG2 central train ongoing:

- Prepare one single macro for most usage cases: ESD/AOD/AOD creation, MC/no MC, pp/PbPb, different collision energies:

`$ALICE_ROOT/PWG2/centraltrain/AnalysisTrainPWG2.C`

- Four tasks now in the macro (FMD, Femto QA, ITS sa spectra, Hadron PID spectra), expect many more
- Local test OK, Central tests await the new Analysis tag.



# PWG2 central train: challenges

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- **Main issue: CPU/memory consumption in PbPb**
  - CPU consumption: mixing to construct signal/background for correlations (Femto, Resonances, DEta/DPhi), grows quadratically with multiplicity
  - Memory footprint: output histograms (3D functions for femto, very fine binning ( $\sim$ pT resolution) for resonances), finely differential analysis (centrality for all analyses), analysis vs. PID (resonances, spectra)
- **Splitting the train is inevitable. Simplest is to split by centrality bin (10% wide) – will need the AliCentrality output in the tags and/or AOD production in centrality bins.**

# Running on the GRID

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- Analysis routinely running on the GRID, large influx of new users
- Two physics papers from PbPb data published:
  - Elliptic flow (centrality dependence)
  - Femtoscopic radii (central events)
- Active preparation of many more analyses

# The End

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