DATA READINESS

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STAR Collaboration Meeting

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Outline

- Runs 14 & 15 (status & recent activities)
- Run 16
  - QA
  - AuAu200
  - dAu Energy Scan
- Calibrations R&D
- Summary

Runs 14 & 15

- Run 14
  - HFT internal alignment was re-checked with fixes for PXL readout, and improved using collision data (March 2016)
- Run 15
  - SST status tables & hit errors were completed (April 2016)
  - pp200, pAu200, and fixed target dataset calibrations completed (January 2016)
    - Some open items for fixed target, like TPC hit errors & dE/dx
  - pAl200: all in place (March 2016) except final BeamLine (~1-2 weeks work)

Run 16: QA Findings

- HFT Status Tables
  - Early identification of impacts of failed calibration jobs
  - Led to improvements in the procedure
- TPC Cathode Trips
  - False alarms in gas system led to unprecedented tripping
  - Exposed what will be an issue for offline reconstruction to exclude data from trip occurrences (still on the to-do list)
- RICH Scaler Failures
  - Problems with VPD scaler measurements pushed reliance on ZDCs for luminosity-dependence calibrations
  - QA tracked when ZDCs had problems

Run 16: QA Misses

- Offline QA shifts were not filled 3 of final 4 weeks of the Run! Some items were missed because of this because no one was looking daily…
  - Several days of FastOffline data used the wrong TPC calibrations (AuAu200 used dAu39) for several days
- A week's worth of automatic TPC calibrations (drift velocity) were wrong, and not discovered until it showed up in other calibration work, causing delays

TPC drift velocity vs. date

- The shift of primary physics triggers out of the st_physics file stream (into st_sst) wasn't clear until other calibration work found st_physics unsuitable, causing delays

Run 16: AuAu200

- The theory: Just like Run 14, so it should be simple, right?
- Two interruptions:
  - Collider diode failure
  - dAu energy scan
- More attention to online/quick calibrations:
  - VPD calibration critical to optimizing the trigger for maximizing good events in reduced operating weeks
  - HFT status tables calibrated from event pool using online farm

Run 16: AuAu200 (realities)

- VPD: mysterious multiplicity dependence (see TOF talk)
- BeamLine: odd *z*, trigger, and time-in-fill systematics
  - Order ~100 μm for vertex positions, implies $\delta(p_T) = \sim 0.001 * p_T$; below the level of historical h^-/h^+ issues (~0.005), so not critical to do better for UPC physics (could be for Heavy Flavor physics)

- TPC dE/dx: odd drift distance dependences
- TPC cathode trips: unprecedented frequency
  - Event-skipping needs implemented
- MTD: unexpected tray-by-tray timing offsets
  - Can be calibrated, but hoping for understanding via cosmic ray data

Run 16: AuAu200 (timeline)

- Evolution of a moving target…

Not all tasks shown (e.g. EMC, BeamLine);
Focus here is on critical path tasks

as of…		May	June	July	August
early May (AuAu ends)	usual estimate: end-of-Run + 2 months		~tracking	~PID	
early June	tracking done	HFT internal; TPC SC&GL; pro-duc-tion; MTD + TOF + TPC dE/dx + HFT global			
mid June (AuAu cntd.)	will need more productions	pro-duc-tion; MTD + TOF + TPC dE/dx + HFT global			
late June	errant calibrations found	pro-duc-tion; MTD + TOF + TPC dE/dx + HFT global			
early July	vacations/ conferences	MTD + TOF + TPC dE/dx + HFT global			
late July	mysteries in data	MTD + TOF + TPC dE/dx + HFT global			

S&C optimization efforts shrank this to only 5 days!

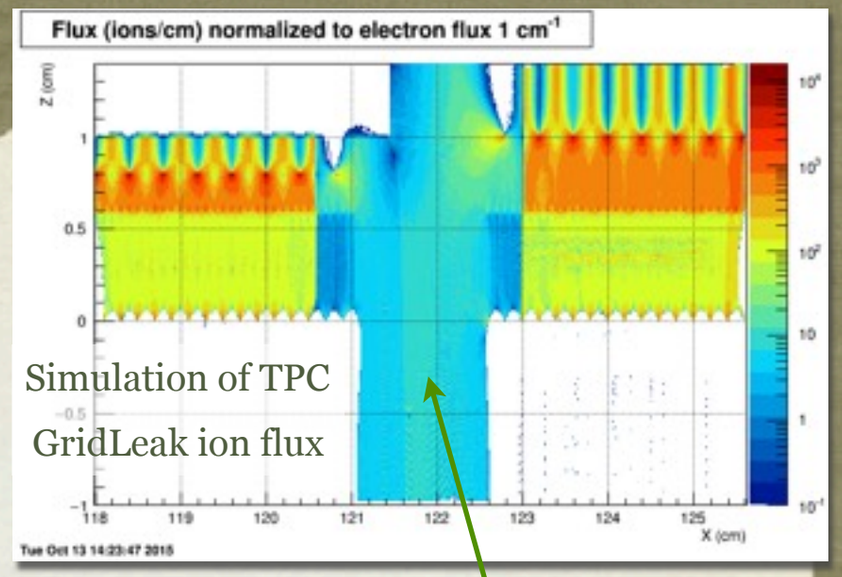
Run 16: dAu

- Dataset priority order set in June: 200, 20, 39, 62 GeV
  - Recent PWG priorities don't change this order; will follow AuAu200
- dAu200 ready for large calibration production for TOF, TPC dE/dx, MTD, HFT, BeamLine [completion in ~1+ month]
- dAu20 SpaceCharge & GridLeak in progress [completion in ~2+ months]
- 39 & 62 GeV not started [completion in ~3-4+ months]

Open Issues

- SLIDE NEEDS WORK
- h-/h+ summary of effect and magnitude of impacts
  - sector-by-sector GridLeak
- EMC gains

Calibrations R&D



- "3D BeamLine" (see Offline Software talk)
  - BeamLine error matrices need implemented
- TPC distortion models
  - Spin-off work from iTPC design work in the TPC group to kill GridLeak distortion: understanding of additional sources of ionic charge in the current TPC (more GridLeaks!)
- Other continuing efforts…
  - ETOW gain calibrations with EMC-triggered data (critical for Runs 13+)
  - TPC dE/dx with better modeling of distributions
  - TPC calibrations using GMT (and track extrapolation: see OffSoft talk)
  - TPC sector-by-sector GridLeaks

Summary

- Contributions of QA seen for both online and offline efforts
- A lot of current calibration activity for Run 16
  - Other datasets are pretty well in hand
- Variety of ongoing R&D efforts to improve calibrations
  - The STAR Collaboration has considerable detector expertise… and opportunities for more to develop!
- Organization structure of subsystem software coordinators working with the S&C team continues to be productive
- We have overcome many obstacles over the years to deliver great science… There's more ahead!