STAR Simulations

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Scope of STAR Simulations

- Prepare all relevant STAR simulations needed for early and accurate physics results from STAR
- Supply long term simulation support for STAR physics analysis
- Use MC event generators for correcting STAR data and for physics comparison to STAR data at the appropriate level of statistics
- Large scale MC study of theoretical models is not within scope

Tasks and Estimated Manpower Needs

- Explicitly define all simulations-related tasks of global applicability not covered by STAR physicists doing specific analysis
- Significant overlap with reconstruction and production infrastructure: individuals will work in more than one area
- But exercise useful nevertheless to gauge overall magnitude of effort required

(FTEs in parentheses; PJ and TW indicate Jacobs and Wenaus)

1. Overall plan and schedule (PJ, TW)
2. Physics priorities and computing requirements (PJ, TW, .5 FTE)
3. Geant: Geant3; investigation of migration to Geant4; consistency of relevant geometry and materials between detector and model; etc. (2 FTE)
4. Detector-specific response simulations (2 FTE)
5. Fast filters for high statistics simulation (1+ FTE)
6. Calibrations: inverse of raw data calibrations, distortion corrections etc. in simulations for use in embedding, assessment of systematic errors, etc. (1+ FTE)

7. Embedding and matching: embed simulated tracks into real events, match MC input and reconstructed tracks. Embedding→tracking→matching used for acceptance and efficiency studies, event generator→tracking→matching used for background estimations. (2 FTEs)

8. Simulation production chain: full MC events for background, embedded tracks in real events for acceptance/efficiency (.5+ FTE)

9. Event generators: production running of nucleus-nucleus, pA, pp, peripheral collisions, fast generators for event-by-event studies, etc.; common RHIC-wide effort (2 FTE from STAR)

10. Offsite simulations infrastructure (.5 FTE)

Remarks

- Total 13.5 FTEs for Simulations Group
- Does not include Wenaus, Jacobs, manpower from reconstruction, production, other infrastructure
- Large amount of simulations effort will come from STAR physicists doing analysis, not counted here
- Large amount of mature software exists in other experiments (EOS, E895, NA49,...); effort must be leveraged
- STAR at NERSC: simulations facility to be defined