Quality Assurance Macros for First Physics
Major Accomplishments

- 7 QA Cut Parameters Done (2 Ev, 2 Tr, 3 Pair)
- Completely Automated on PROOF/Local:
  - Bin sizes calculated for user and outputted in both human readable and C++ Source Code Format
  - Diagnostic Histograms produced for each Cut Parameter
- Required new and modified AliFemto classes submitted for inclusion in AliRoot Trunk
- Technique developed for passing dynamically calculated cuts to analysis within Analysis Framework
Completed Macros

- Event Level Multiplicity Binning (Status: Finished)
- Event Level Vertex Z Position (Status: Finished)
- Number of TPC clusters per Track (Status: Reworking — Building a new final histogram and analysis macro)
- TPC $X^2 / DOF$ for Track (Status: Reworking — Building a new final histogram and analysis macro)
- Pair Share Quality (Status: Finished)
- Pair Share Fraction (Status: Finished)
- Pair TPC Entrance Separation (Status: Finished)
Future Macros

- Event Reaction Plane Orientation
- Event Azimuthal Position of Primary Vertex (Soon)
- Pair $K_T$ Cuts (Soon)
- Pair $\phi$ Cuts
- Pair TPC Average Separation (Soon)
- ITS $X^2 / DOF$ for Track (Soon)
Running the Macros

• PROOF / Local:
  - Collect all par files needed for AliFemto code in root directory.
  - Run shell script:
    ```bash
    ./runProof.sh "dataSet"
    ```
  - Run display macro:
    ```bash
    root 'display.C()'
    ```
  - Shell script has options to run only one or more QA macros. Run
    ```bash
    ./runProof.sh -h
    ```
    for a list of options.

• Grid / Batch:
  - Automated script not done yet. (Soon)

Note:
Currently working on a full set of instructions for using these macros. They will be displayed on the AliFemto Twiki, there is already a page under:

QualityAssurance/FirstPhysicsQAMacros.

Instructions will be complete and posted soon.
Displaying the Histograms

Select QA Plots

Display of Diagnostic Histograms
Pair / Track Level Cuts

- Plot 1:
  - Series of 1D $Q_{\text{inv}}$ Correlation Functions taken as allowed Share Quality value increases form -0.5 to 1.0

- Plot 2:
  - Numerator of Plot 1. 1D count of real pairs as a function of $Q_{\text{inv}}$ as Share Quality value increases.
Event Level Cut Plots

- **Plot 1:**
  - Event Multiplicity distribution divided into 3 regions.

- **Plot 2:**
  - Divide mixed pairs from only lower region by mixed pairs from both low and high regions. Fit line to plot.

- **Plot 3:**
  - Normalized Plot 2, with points colored according to deviation from unity.
Run Initial Analysis:
ConfigFemtoAnalysis.C
runProof.C

Run Binning Macros:
Femto.ESD.root
MultDistRegions.C
ZVertDistRegions.C
...

Collect Bin Parameter Classes:
AliFemtoEventMultBins.h
AliFemtoEventZVertBins.h
...
Run QA Analysis:
ConfigFemtoAnalysis.Low.C
ConfigFemtoAnalysis.Split.C
runProof.C

Run QA Macros:
Femto.ESD.Low.root
Femto.ESD.Split.root
plot_EventMult.C
plot_EventZVert.C

PWG2femtoscopyParameters.par
Parameters PAR File

- Contains classes generated by Binning Macros with constructors that initialize to values found by macros.

- Later ConfigFemtoAnalysis.C files which needed to be hard coded with bin limits by user can now read machine generated classes at compile time. This allows process to be automated and reduces potential sources of error.

- Holds class which contains default values for ConfigFemtoAnalysis.C files. This allows user to change value in one location and propagate it across all QA macros.

- Could potentially be used to hold bin values for other femtoscopic analysis. Directory is entirely local and can potentially contain source code which user needs but does not want to propagate to AliFemtoUser.
Summary

- Most important QA macros for first physics completed and working. Additional macros coming shortly.

- Run scripts for PROOF/Local analysis are completely automated and done. Batch/Grid coming soon.

- Diagnostic histograms produced by these macros can be accessed and manipulated through a root GUI by running `display.C` macro.

- Documentation is lagging, as recent changes have been made to the macros. It will be finished soon and posted to the AliFemto Twiki. Run scripts are self documented by built-in help option.