Things to do to Finalize the AuAu Data Analysis

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1 Introduction

I think that in parallel to the on-line (or semi-online) calibration and reduction of d + Au data we should make an attempt to finalize the Au+Au data reduction. We will certainly find this effort profitable for the analysis of the d+Au and p+p data. This process will require us to redo some of the calibrations, add calibrations which are, at present, missing, revist the data reduction, and re–evaluate efficiencies in the FS, and probably also the MRS. We also need to iterate the bdst software, to be sure that we include all necessary information.

We should also be aware of some of the outstanding unsolved problems which continue to plague the experiment. Among these issues we find: inconsistency among momenta measured in D2, D3, and D4, an incomplete understanding of the TPC performance, and efficiency of C1, RICH in various VETO modes.

Because, some steps in the reduction process depend on some other things it is a very important that we perform these tasks in the correct order. In the next section I will describe all that should be done, step by step. Another, and perhaps more difficult issue is who can do it.

2 Things to do step by step

step 1. Re-calibrate T1 and T2 using T3 tracks for runs between 5581 and 5656. These runs should be re-reduced (1st reduction level) after the calibration is done.

step 2. At least for runs with new T1 and T2 velocity calibration and high momentum runs we should repeat calculation of the matching offset and sigmas. I would suggest we update the software to include the BrDcEnhancementModule and repeat calculations for all Au+Au runs of interest.

step 3. Re-do all the global tracking (2nd reduction level). The Script which does the global tracking should be updated to include the BrDcEnhancementModule.

step 4. Re-do all the TOF calibration for H1 and H2. The TOF calibration we have right now was done before we setup the final FS geometry, before calibration of T1 and T2 via T3 and before vast improvements in the DC tracking (e.g. DC enhancement - before utilizing BrDcEnhancementModule, we had very few, if any Fs tracks to do calibration for some of the H2 slats).

step 5. Re-do the DSTs (3rd reduction level). On this level we merge the global track information with the tof calibrations and Cherenkov detectors information.

step 6. Re-calculate tracking detector efficiencies. This calculation utilizes the reduced data (after a first reduction level) and tof calibration information. The calculated efficiencies are stored in the form of 3D histograms which enables us to handle the efficiency dependency on 3 variables.

Step 6 is independent on step 5 - which means that we don't have to wait for DSTs to calculate efficiencies.

step 7. This is a last step which directly leads us to the physical observables like the absolute particle spectra. The output is written in the form of tree. In this step we perform the final particle identification and combine DSTs with detector efficiencies and spectrometer acceptance.

3 Some comments

Right now, for step 7, we have only a prototype version of the software (now stored in a package called bdst). We are in the process of reorganizing the package to make it more transparent and more logical.

There is no efficiency calculation for MRS detector, however in can be introduce for 0-field runs in the similar way as it is done for FS. We can also use the track embedding proceedure in the MRS, after testing it against the results of the tracking efficiency calculation in the FS.

RICH efficiency calculation is possible by using the bdst framework (as an option). This part also needs some updates.