The effective use of a kinematic fitter for any nuclear/particle physics reaction requires an accurate estimate of the uncertainties of the measured kinematics (, , , etc.). Unfortunately for the current state of CLAS12 tracking, we do not have valid covariance matrices. Therefore, if one wants to implement a kinematic fitter tool on CLAS12 data, it is necessary to first model the covariances across all kinematics available within the acceptance of the CLAS12 detector. To do this, we have chosen to empirically measure the covariances using full GEMC simulations. Due to kinematic dependencies of the covariances, it was decided that a binned and interpolated approach would be most appropriate. To begin this process of modeling the covariances of the CLAS12 detector, we started with the drift chambers. This decision was based on the importance of the drift chambers for most physics reactions. But a fully functioning kinematic fitter will need covariance matrices for other detectors as well (Forward Tagger, ECAL, CVT, etc.).

**Drift Chamber Covariance Matrix Extraction**

The concept is straightforward. First, generate a single particle in the detector over the desired space. Since we are initially just measuring the DC covariances, the particles were generated over the just range covered by the forward detector. Then, reconstruct the generated single-particle events with the standard CLAS12 reconstruction software. Next, bin the data in , , and . Other kinematic variables can be used, but these are the ones chosen to measure the covariances for this project. (These are also the kinematics used in the kinematic fitter.) Finally, comparing the reconstructed and generated values for the chosen kinematics, the DC covariance matrices for a given particle can be calculated.