Pion Polarizability MC Studies

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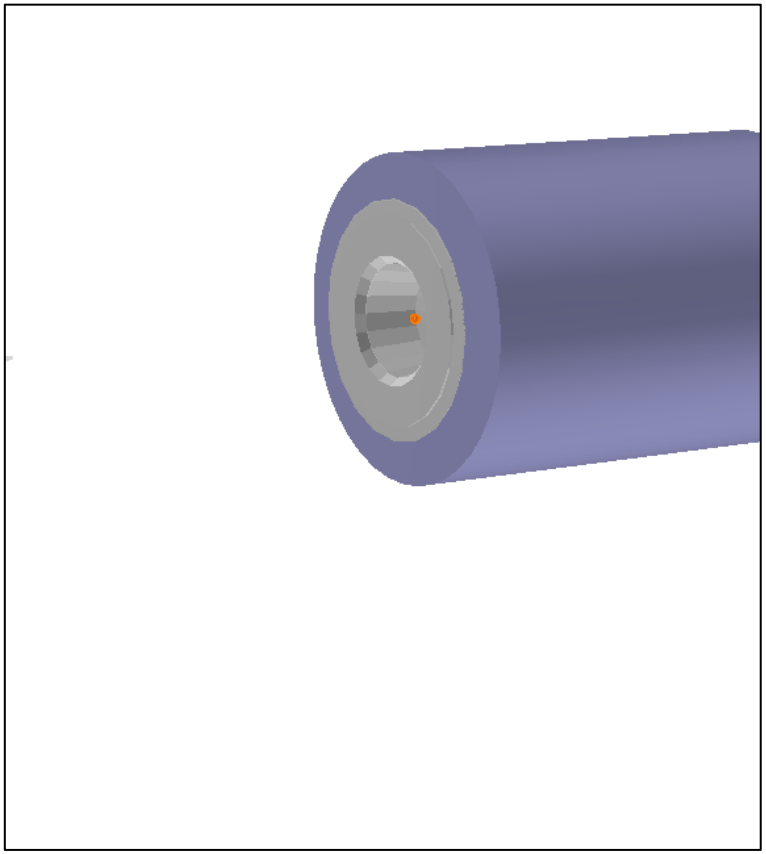
Geometries



https://halldweb1.jlab.org/wiki/images/9/97/20120426_Upstream_target.gif

Upstream target geometry where target was placed 1m upstream from nominal GlueX target position. Orange marker indicates location of target.

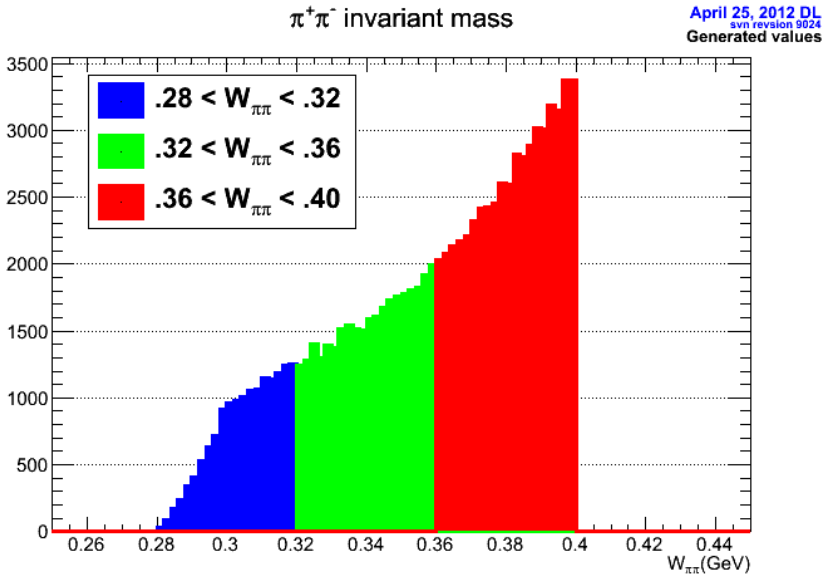
Two geometries used for the current study:

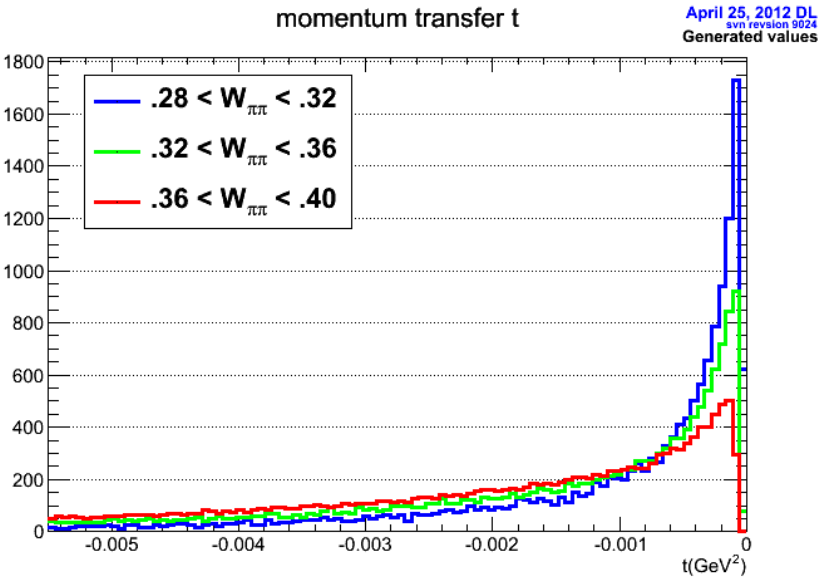
1.) Nominal GlueX geometry with 30cm LH2 target replaced with 5% rad. len. Pb target.

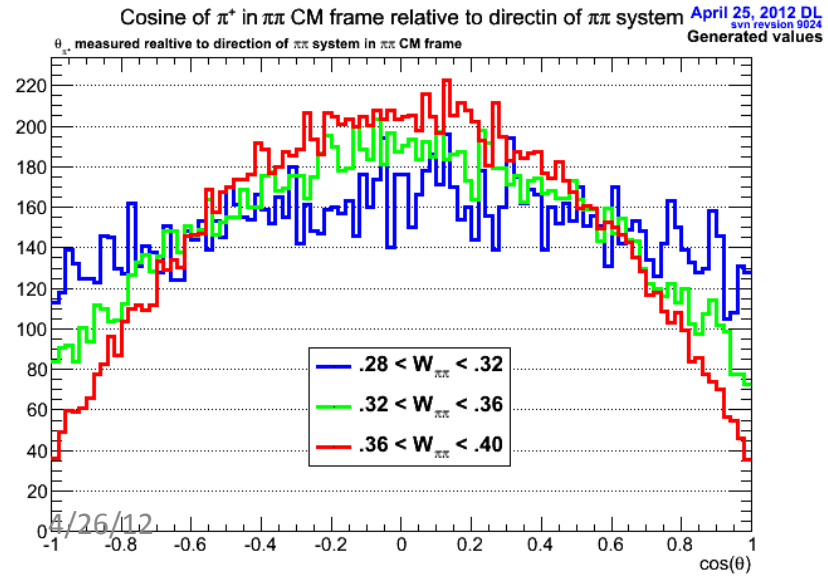
2.) Same as 1.) but with Pb target moved 1m upstream and start counter removed.

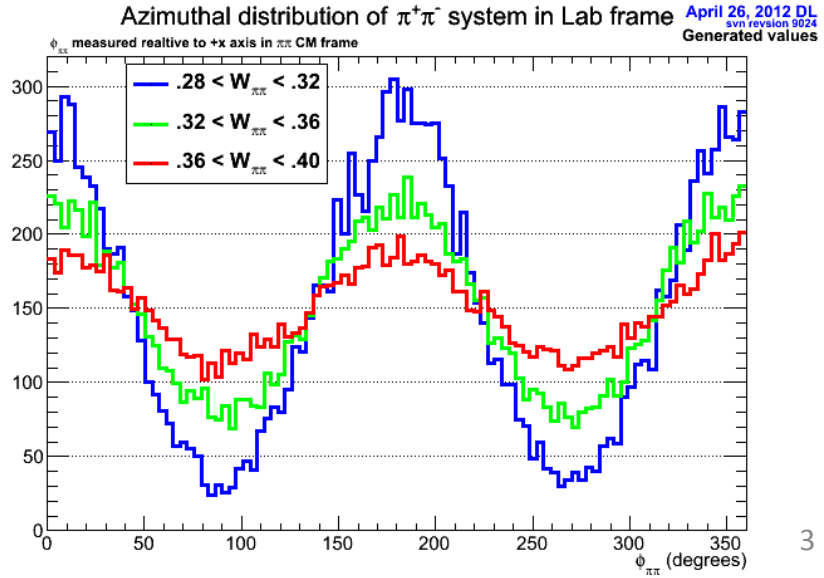
For both geometries, the XML was updated and the material map for the target region was regenerated

Generated distributions

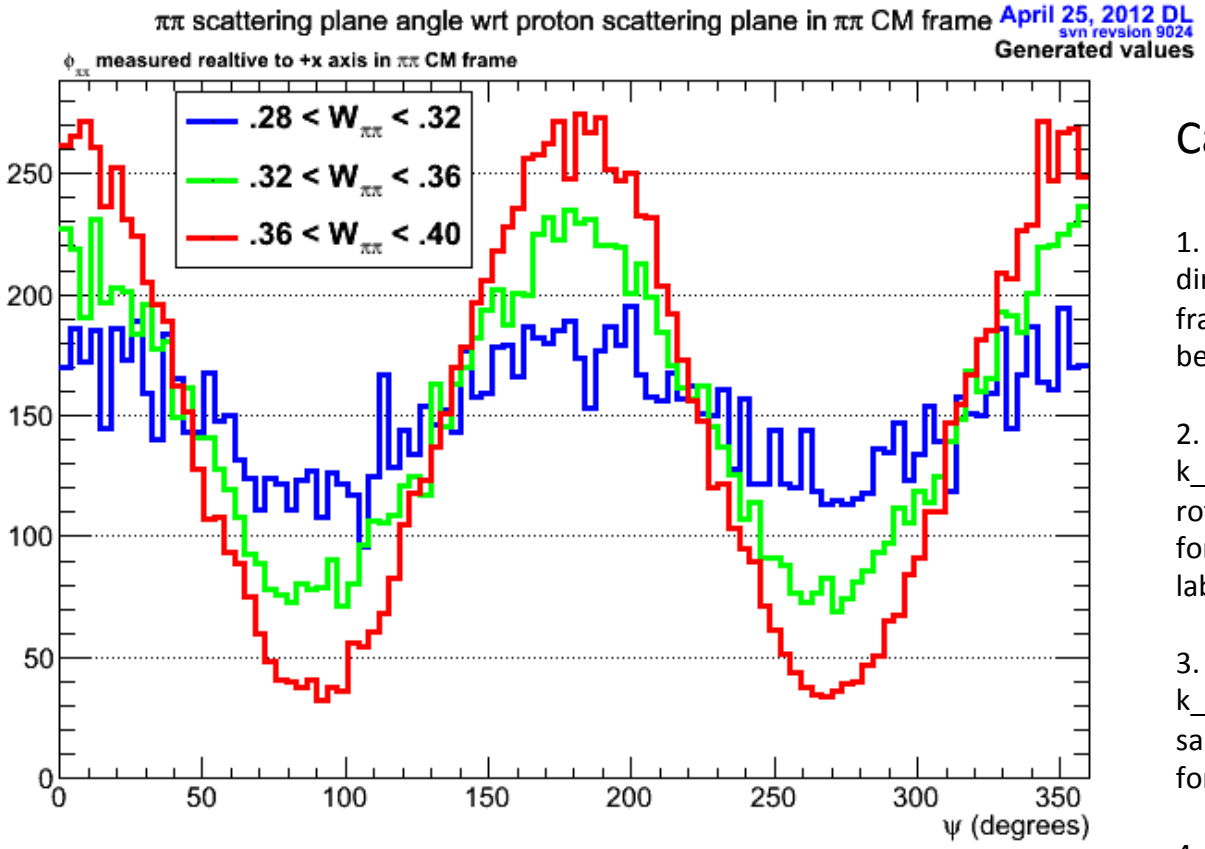








ψ From generated events



Calculated using Rory's recipe:

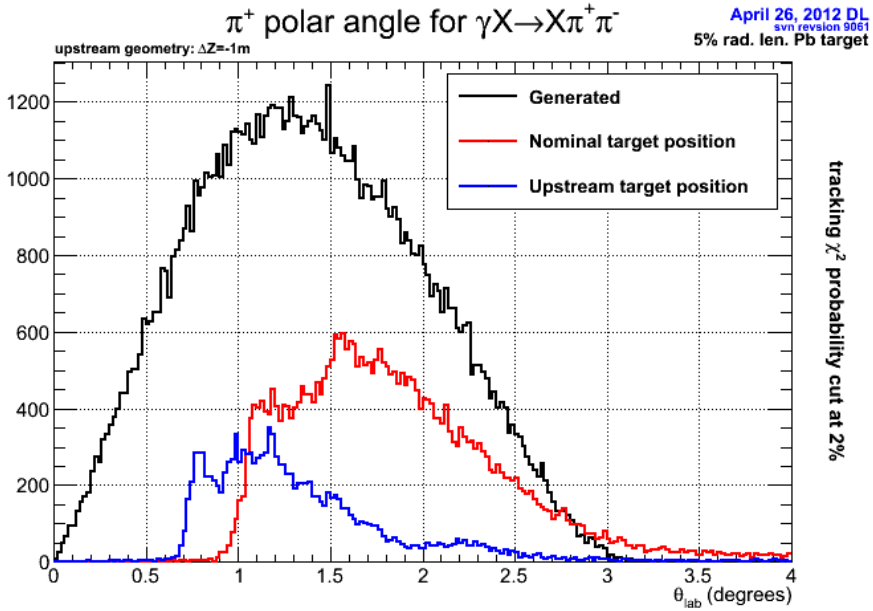
1. Find the unit vector k_hat that points in the direction of the pipi cm system in the lab frame, where the
beam axis is in the z direction.

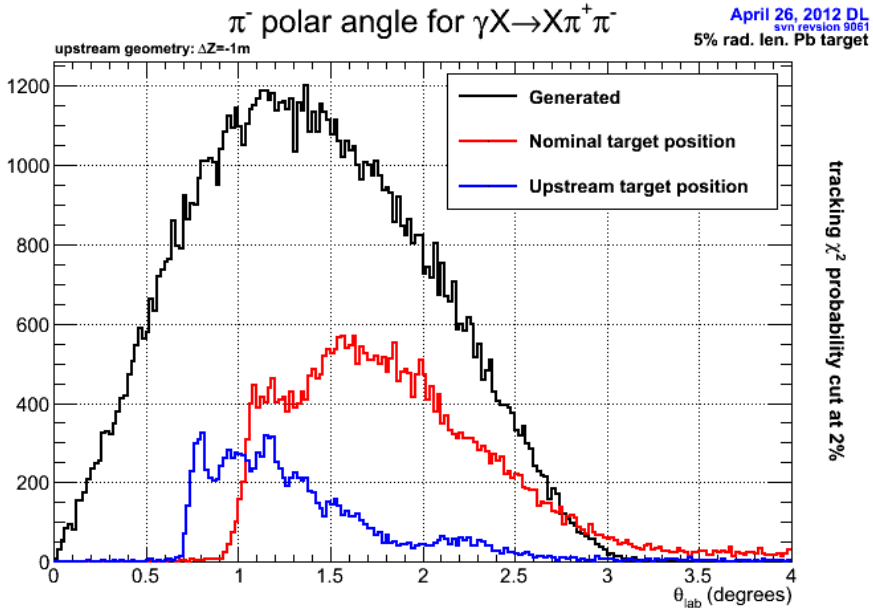
2. Do a rotation around the y axis, so that k_hat is now in the y-z plane. Do the same rotation
for the k+_hat, the unit vector pointing in the lab direction of the pi+.

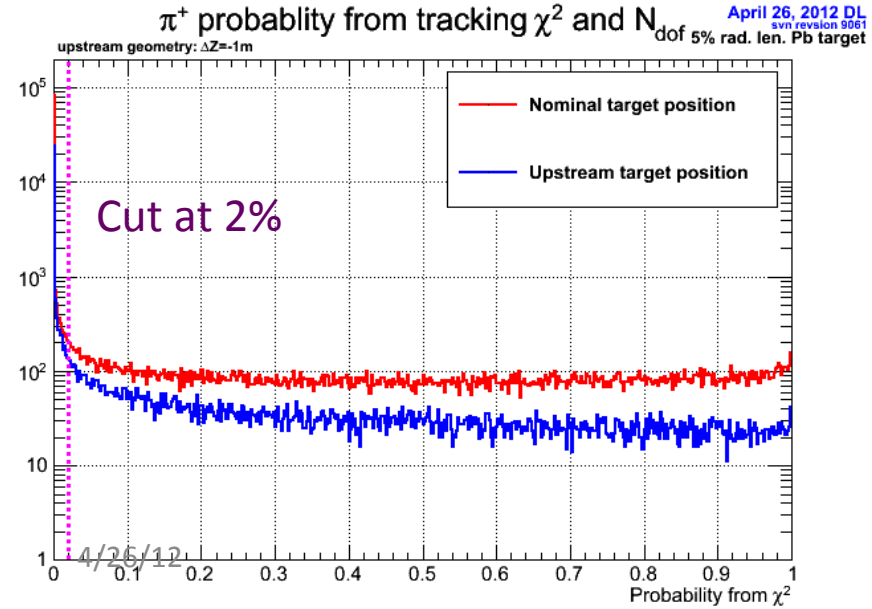
3. Do a rotation around the x axis, so that k_hat now points in the z direction. Do the same rotation
for k+_hat.

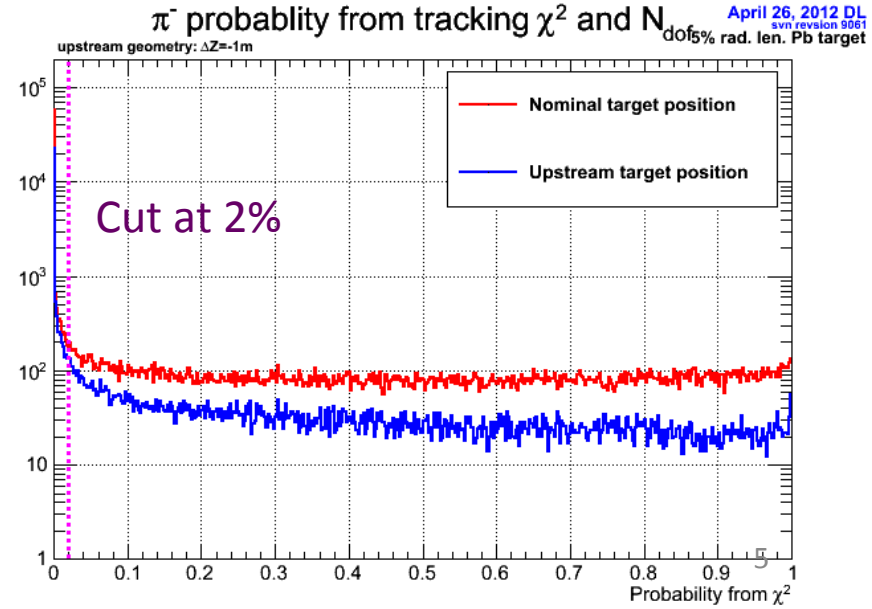
4. The angle psi is given by cos(psi) = k+_x/ sqrt(k+_x^2+k+_y^2)

Fully reconstructed θ_{lab}

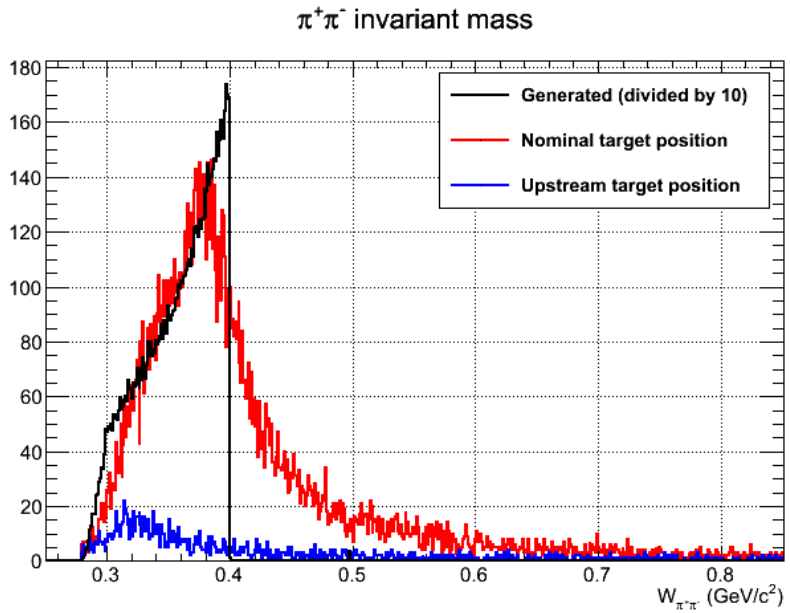


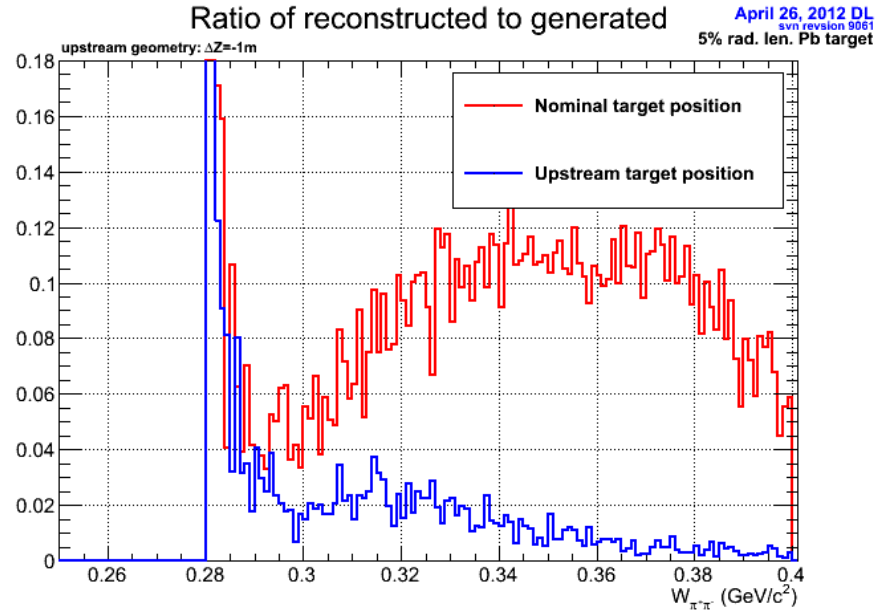






$\pi^+\pi^-$ invariant mass





Acceptance here is very low for the upstream target geometry.

Tuning the tracking code to this geometry should (hopefully) improve this significantly.