Brief GlueX Note
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Comparing GlueX and E852 Calorimetry

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This is something I wish I had done for the calorimetry review. I compare the calorimetry for BNL E852 and GlueX with respect to the $\eta\pi^0$ final state. In E852 the reaction is $\pi^- p \to \eta\pi^0 n$ with $p_{\pi^-} = 18$ GeV/c while for GlueX $\gamma p \to \eta\pi^0 p$ with $E_\gamma = 9$ GeV. The comparison in acceptance for $\eta\pi^0$ mass for BNL E852 and GlueX for the mass range from 0.7 to 2.5 GeV/c^2 is shown in the top two plots of Figure 1. The comparison in acceptance for $\cos\theta_{GJ}$ for BNL E852 and GlueX for the mass range from 1.3 to 1.4 GeV/c^2 mass range. is shown in the bottom two plots of Figure 1. The E852 acceptance required that photons be contained within within the lead glass calorimeter, with no photons in the beam hole, a threshold energy of 150 MeV and that all photons be separated by at least 8 cm at the calorimeter. For GlueX, we also impose the beam hole cut, threshold energies of 50 and 100 MeV in BCAL and FCAL respectively and the 8 cm photon separation. I also impose an additional 1° angle cut at the BCAL/FCAL boundary. Note that our acceptance is about 75%. I believe that Mihajlo gets about a 45% overall acceptance after photon reconstruction and kinematic fitting. The E852 plots are from the IU PhD thesis of Rob Lindenbusch.

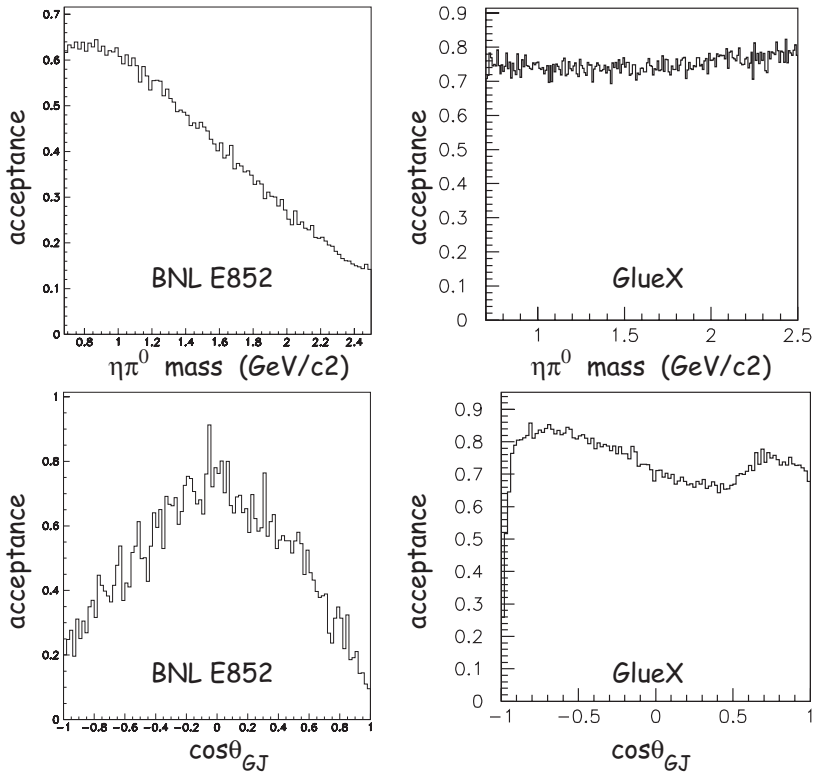

Figure 1: The top two plots show the acceptance in $\eta\pi^0$ mass for BNL E852 and GlueX for the mass range from 0.7 to 2.5 GeV/c^2. The bottom two plots show the acceptance in $\cos\theta_{GJ}$ for $\eta\pi^0$ masses in the 1.3 to 1.4 GeV/c^2 ($a_2(1320)$)mass range.