

Update on GlueX Analysis at IU

March 11, 2013
GlueX Physics Meeting
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Overview

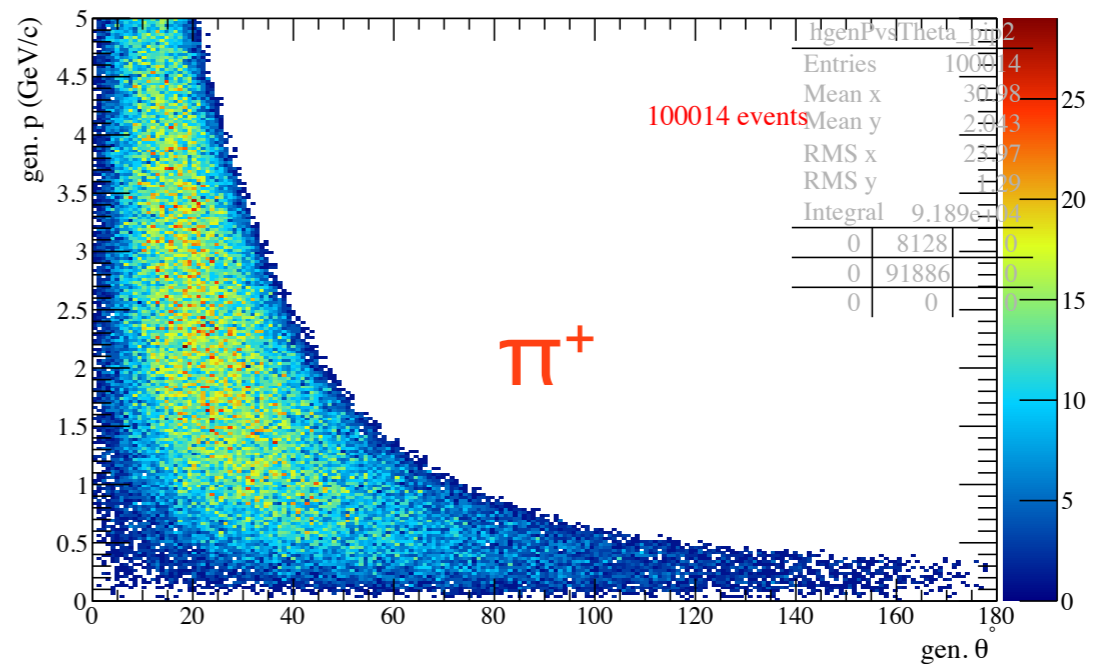
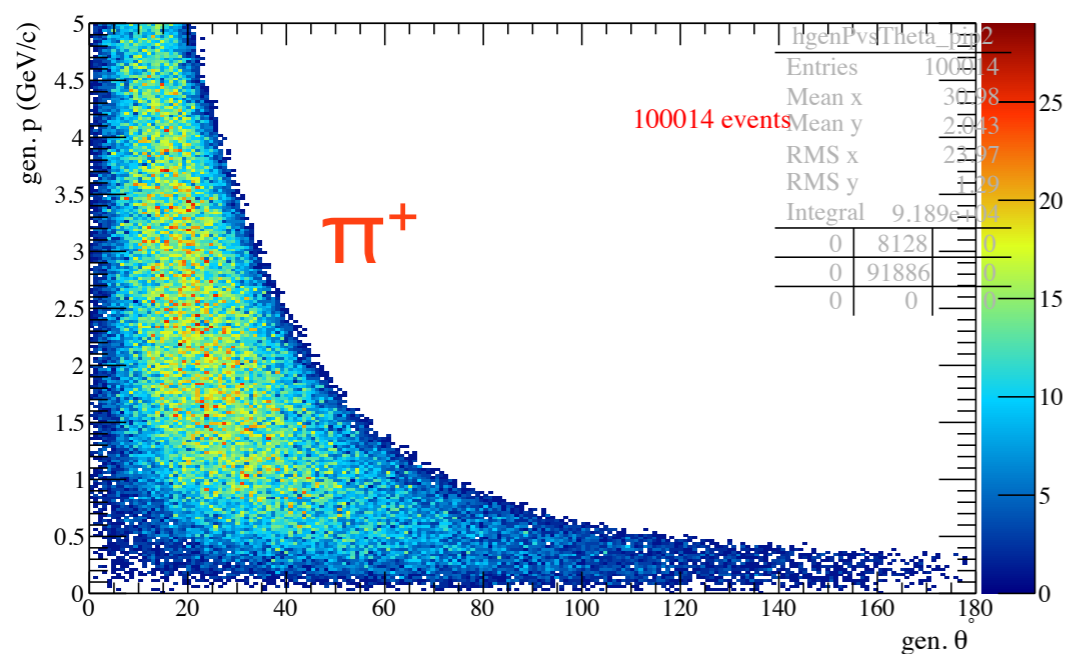
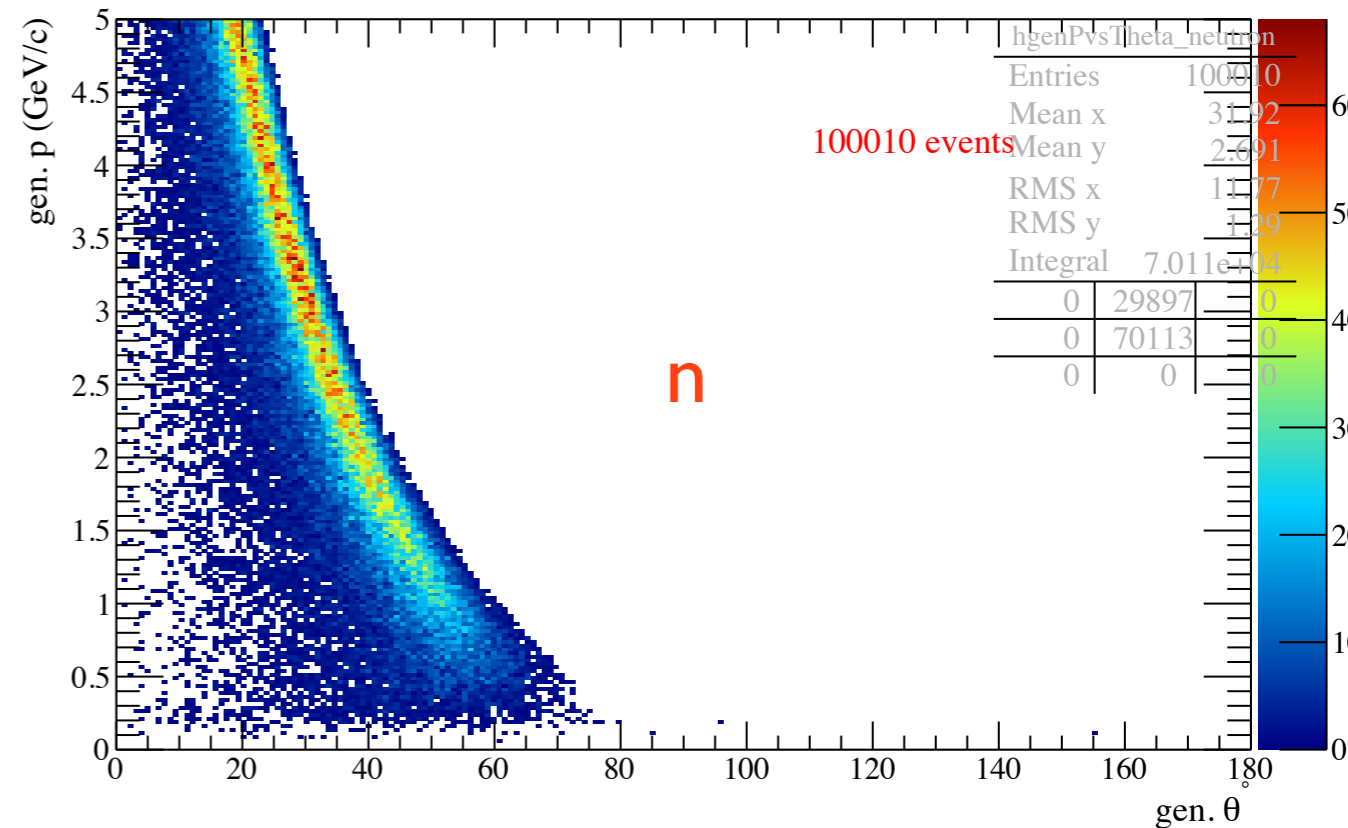
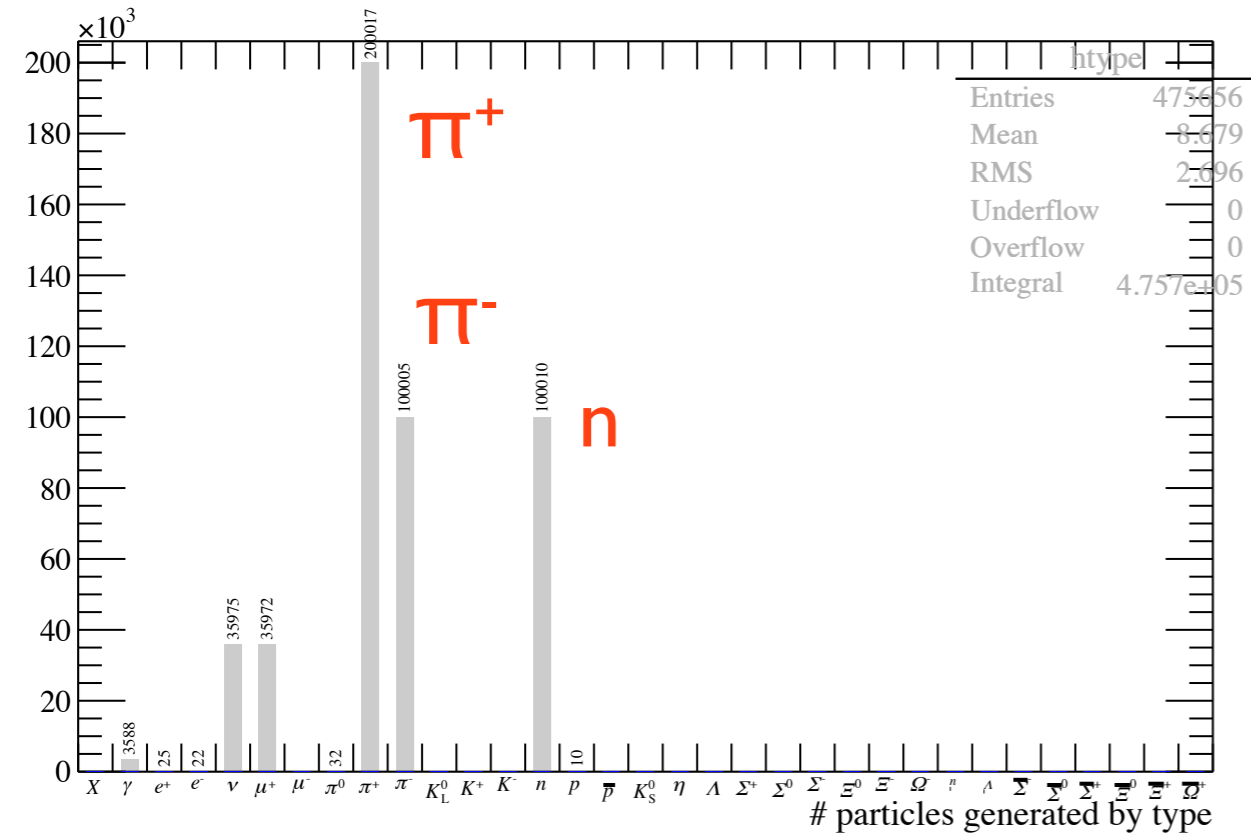
- Starting to get back into GlueX software development
- Working with two IU undergrads
- Goal is for two undergrads to work on separate channels, do acceptance studies, work on analysis cuts, and find bugs in analysis code
- Start with channels $\rho^0 p$ and $\pi^+ \pi^+ \pi^- n$, also work on $\eta' \pi N$

Code

- Using tag release 2013-01-11/2013-02-25
- Working with Paul's analysis code
- Use Paul's kinematic fitter, but do not use the `DHistogramAction` and `DCutAction` classes. All final state particles are in the same `DReactionStep`
- Save reconstructed variables in `TTree` and use separate program to do analysis
- Don't want to upgrade `ANALYSIS` code frequently, as this still seems to be in development

$\pi^+ \pi^+ \pi^- n$

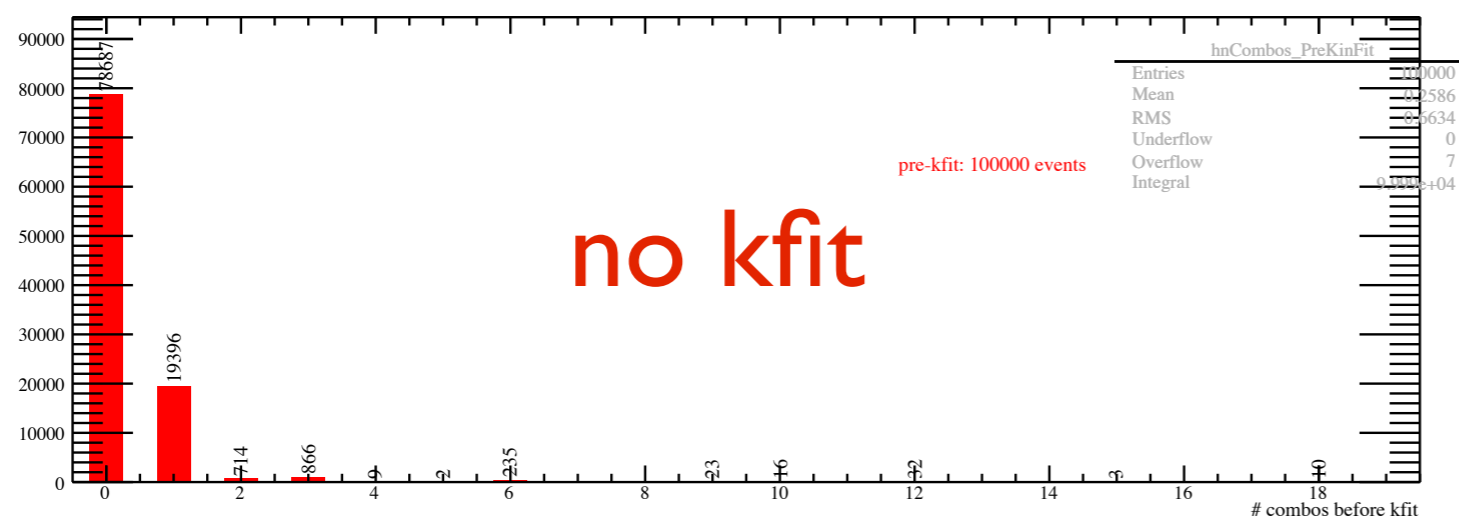
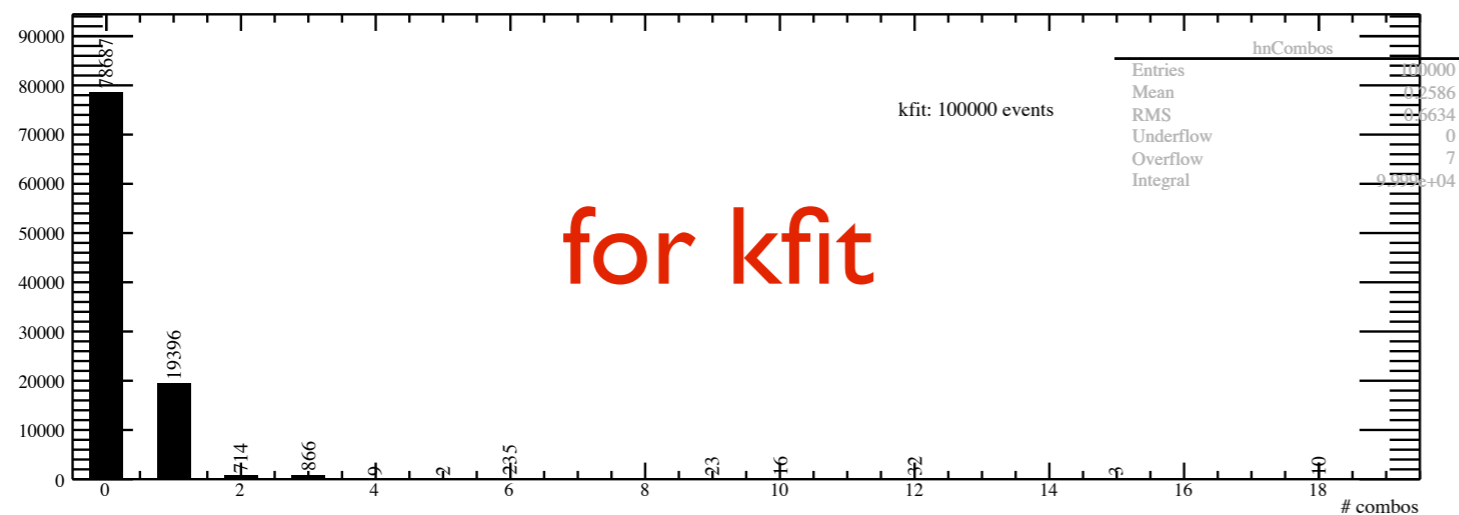
- Generate events with genr (t-slope of 0.05 to get broad angle range)
- similar plots for $p \pi^+ \pi^-$



Recon. Eff.

- No cuts imposed explicitly
- All particles are part of one DReactionStep
- Code is tag release 2013-01-11
- Efficiency depends on t-slope and other dynamics
- Undergrads looking into efficient cuts to clean data

of combos reconstructed



efficiency
~20% to find
1 combo of
 $\pi^+ \pi^+ \pi^-$ (n)
(~16% for $p \pi^+ \pi^-$)

Data Challenge Files

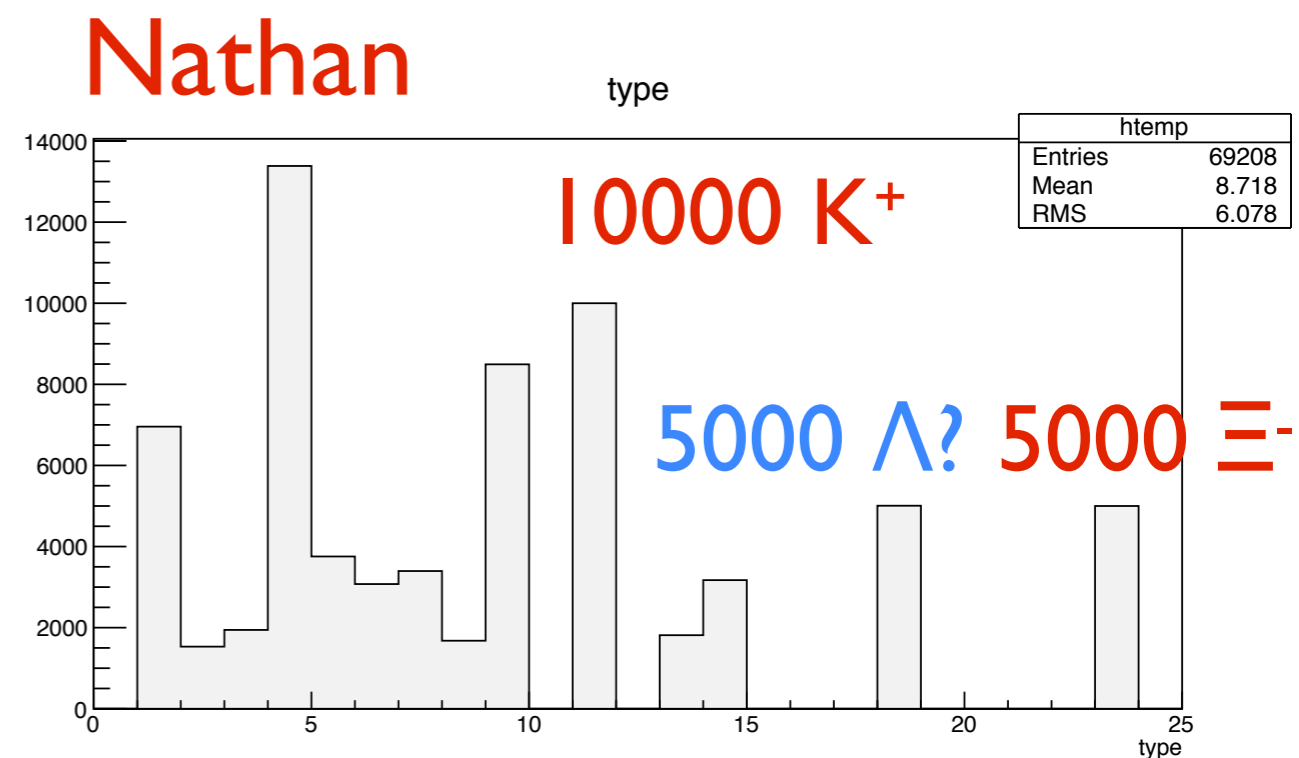
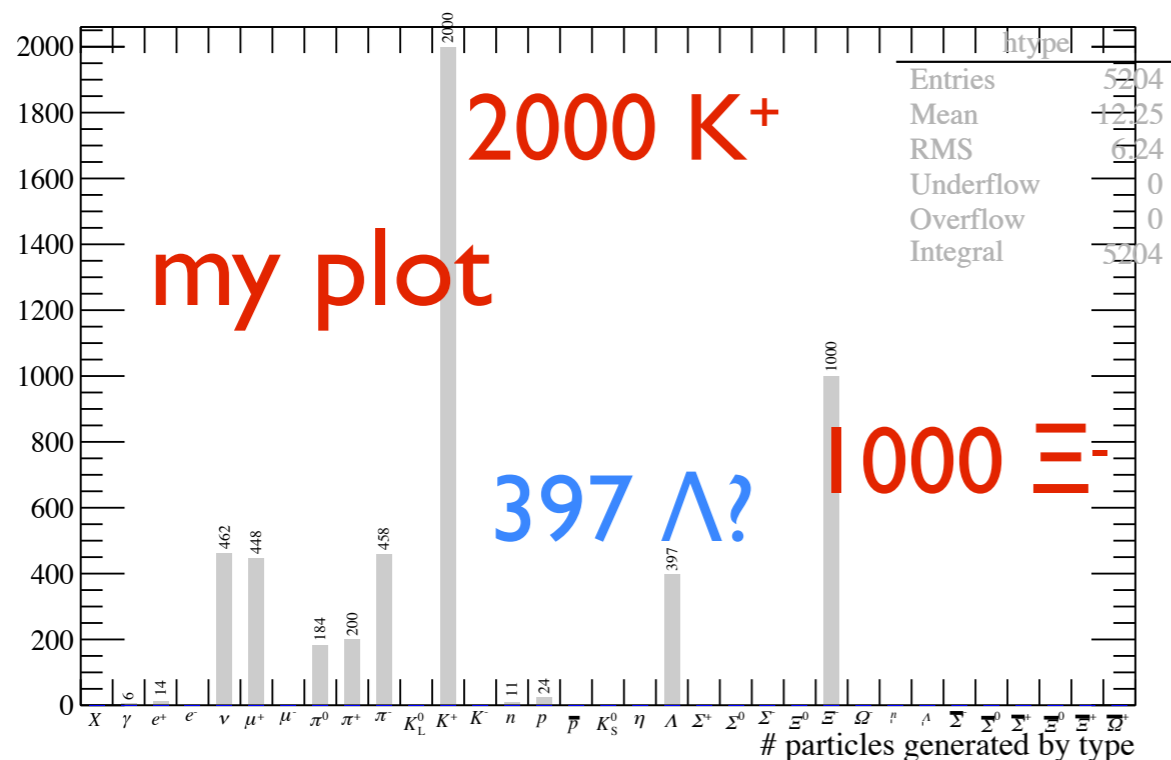
- Ran 3pi n processor over 5 data challenge files that were downloaded locally (~250k events total)
- Takes 15 minutes to process 1 file (~60 Hz)
- Will move on to using grid when code is more developed
- Getting generated information so far has been a pain/asking for input

Ξ Studies

- Ξ involving K_S not studied in detail?
- $\gamma + p \rightarrow K^0 Y^{*+}, Y^{*+} \rightarrow K^+ \Xi^0$
- $\gamma + p \rightarrow K^+ Y^{*0}, Y^{*0} \rightarrow K_S \Xi^0$
- Final state is $K^+ K_S \Lambda \pi^0$
- Should have detached vertex for Ξ^0, Λ
- genr8 not working yet... would like feedback

Problems with Ξ s

- Used genr8 to create $K^+ K^+ \Xi^0$ events (tag 2013-02-25)
- In analysis code, reconstruct DMCThrown objects, look at DMCThrown::PID()
- When processed through analysis, don't get many Λ events (Nathan does)



Summary

- GlueX analysis studies resuming at IU
- Undergrads Kevin, Tom will work on eff. of $\pi^+ \pi^+ \pi^- n, p \pi^+ \pi^-, \eta' \pi N$
- I plan to work on $\Xi^{(*)}$ channels
- Hope to analyze Data Challenge Files
- Updating status at <http://dustbunny.physics.indiana.edu/~kmoriya/GlueX/index.html>