Amplitude analysis of GlueX phase 1 $(p\eta'\pi^0)$ data using waveset from VMD (Vector Meson Dominance) model for a_2 photoproduction

Florida International University 2021

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1. Fitting entire GlueX phase 1 data (adding fall 2018) for four γ polarization plane angles relative to horizontal (0, 45, 90, 135^o) + amorphous data using loop statement in AmpTools

2. Fit intensity with a waveset that includes S, D waves, where we include only certain M and ε values for D waves that are expected to have nonzero contribution based on Vincents VMD model (Vector Meson Dominance):
   - $S_0^{(+)}, S_0^{(-)}, D_0^{(+)}, D_1^{(+)}, D_2^{(+)}, D_{-1}^{(-)}, D_0^{(-)}, D_1^{(-)}$

$$s = m_N^2 + 2m_N E_\gamma,\ E_\gamma = 8.5\ \text{GeV and}\ t = -0.2\ \text{GeV}^2.$$

$$^{(+)}[D]_{m=2} = 2.35 \qquad ^{(+)}[D]_{m=1} = 0.82 \qquad ^{(+)}[D]_{m=0} = 0.11$$

$$^{(-)}[D]_{m=1} = 0.84 \qquad ^{(-)}[D]_{m=0} = 0.45 \qquad ^{(-)}[D]_{m=-1} = 0.09$$

Photoproduction of $a_2(1320) \to \eta\pi^0$
Vincent Mathieu
May 26, 2021

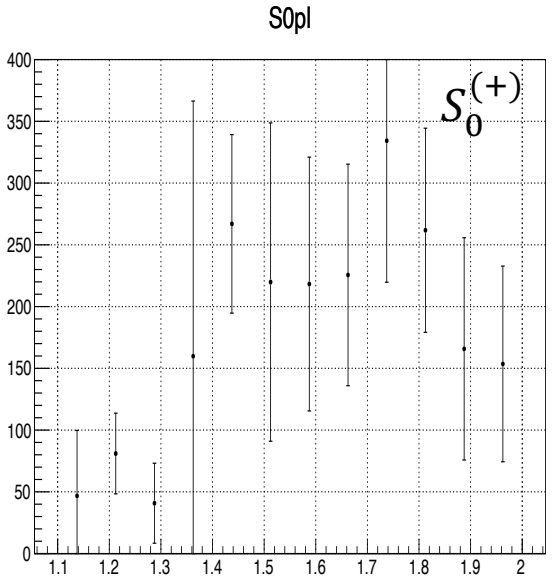
3. Invariant mass bin size of 75 MeV/c^2, momentum transfer bin size of 0.6 (GeV/c)^2

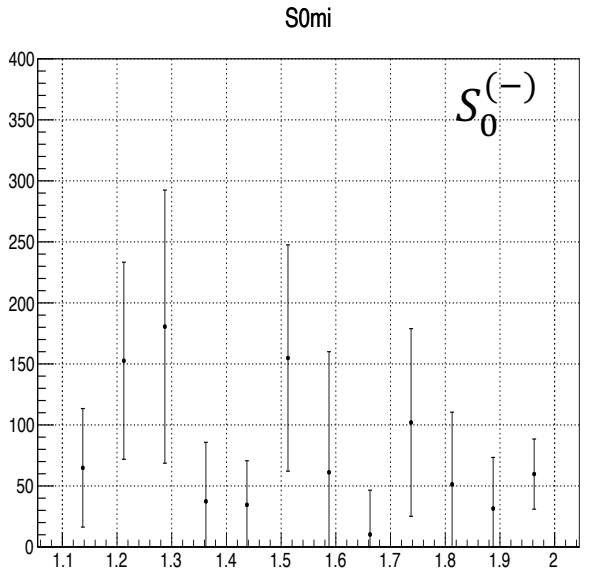
4. Hopefully, the increased statistics and decreased number of fit parameters will allow to also calculate uncertainties from bootstrapping method

Plot acceptance uncorrected results

Fit with $S_0, P_{0,1}, D_{0,1,2}$ ε=±1

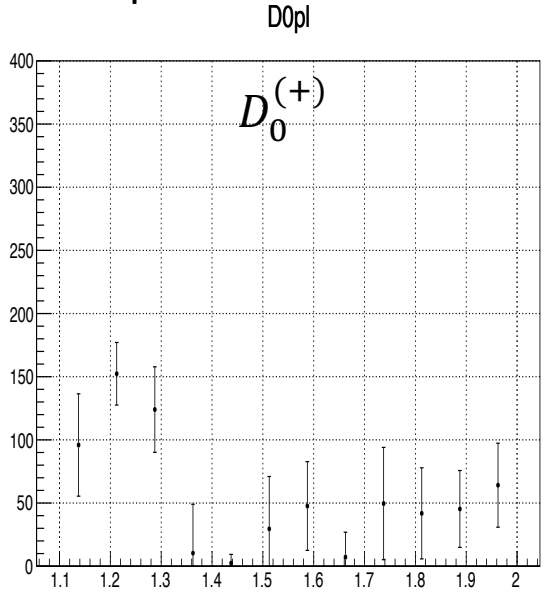
Acceptance uncorrected

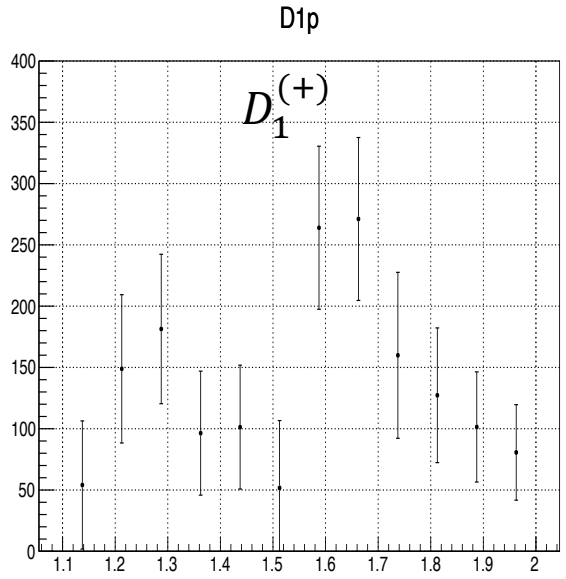


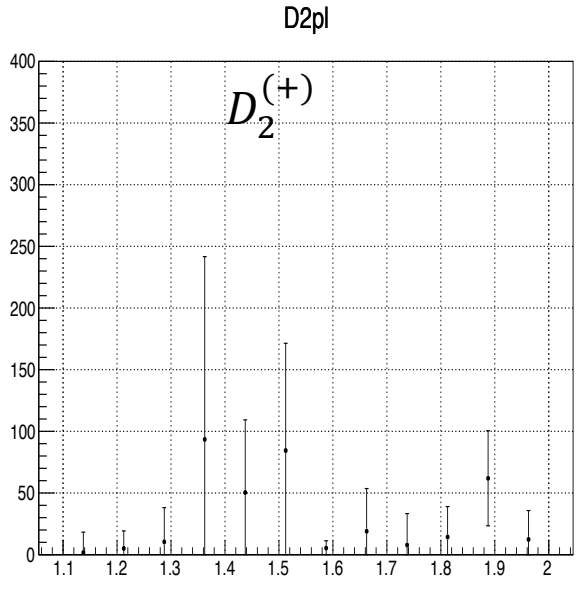


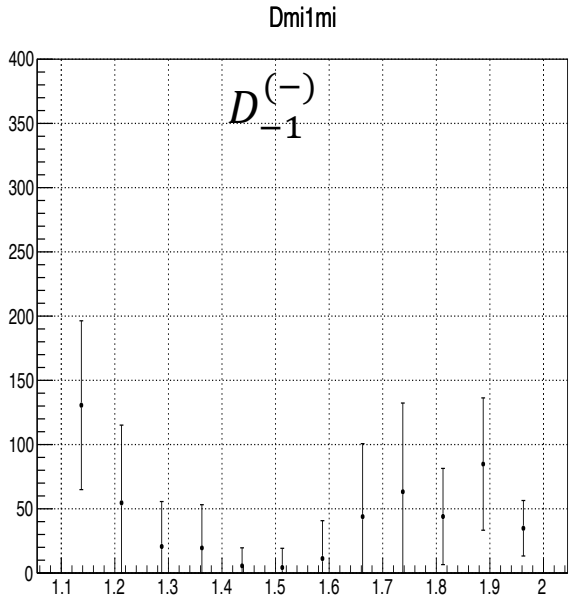
Fit with $S_0, P_{0,1}, D_{0,1,2}$ $\varepsilon=\pm1$

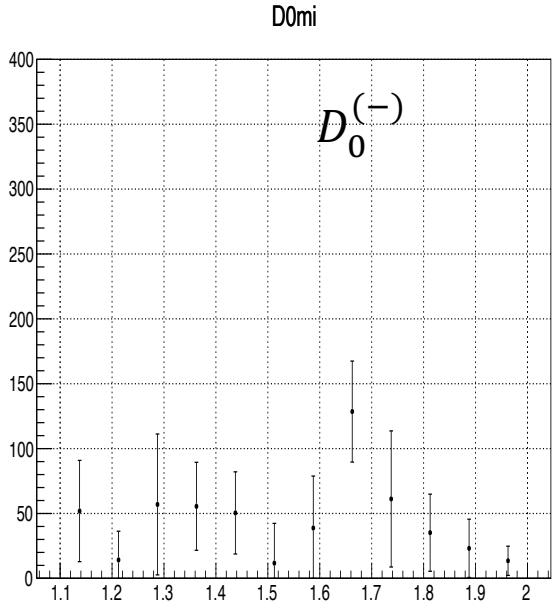
Acceptance uncorrected

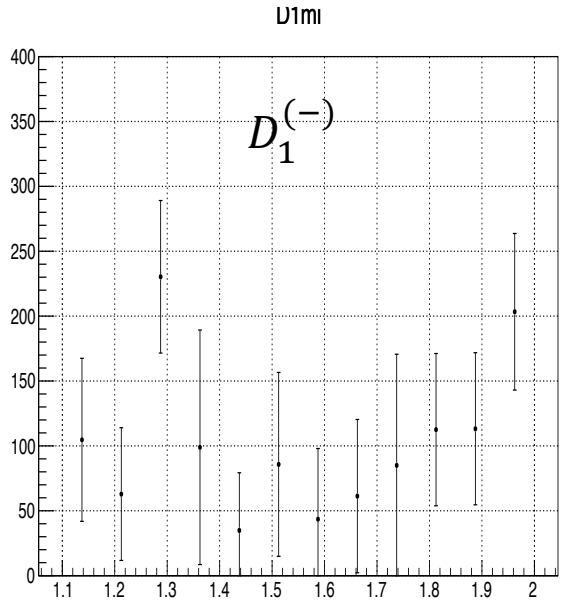


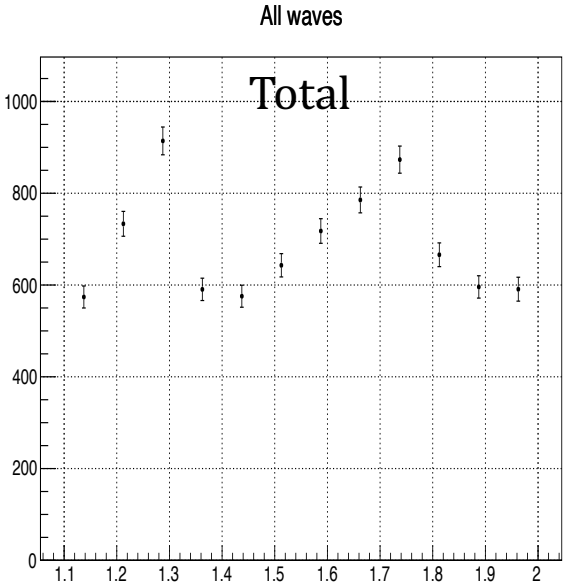






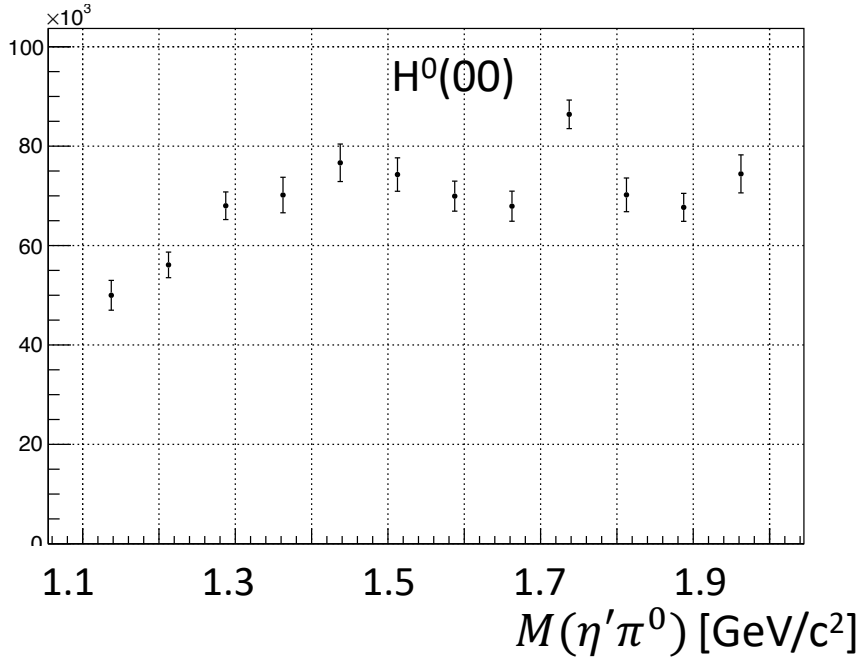


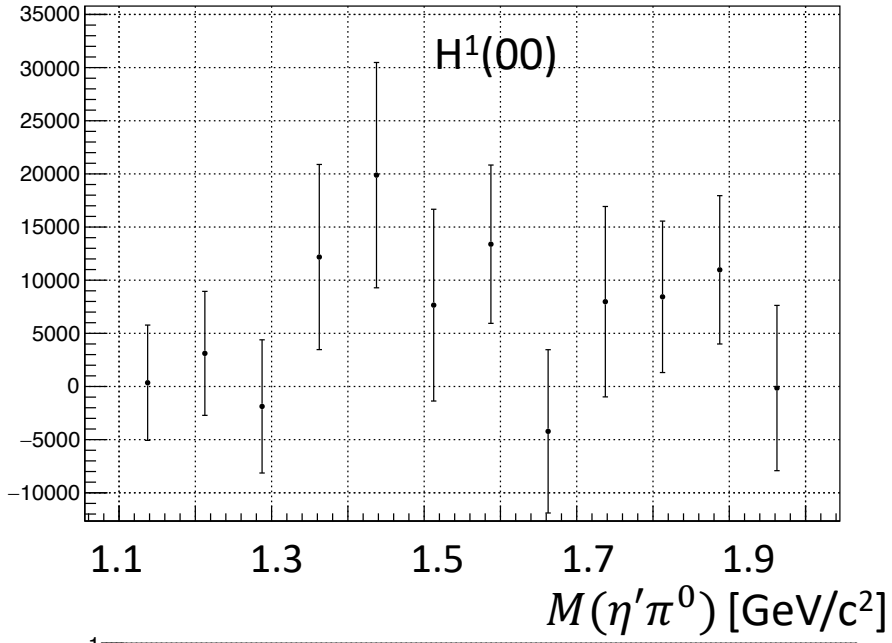


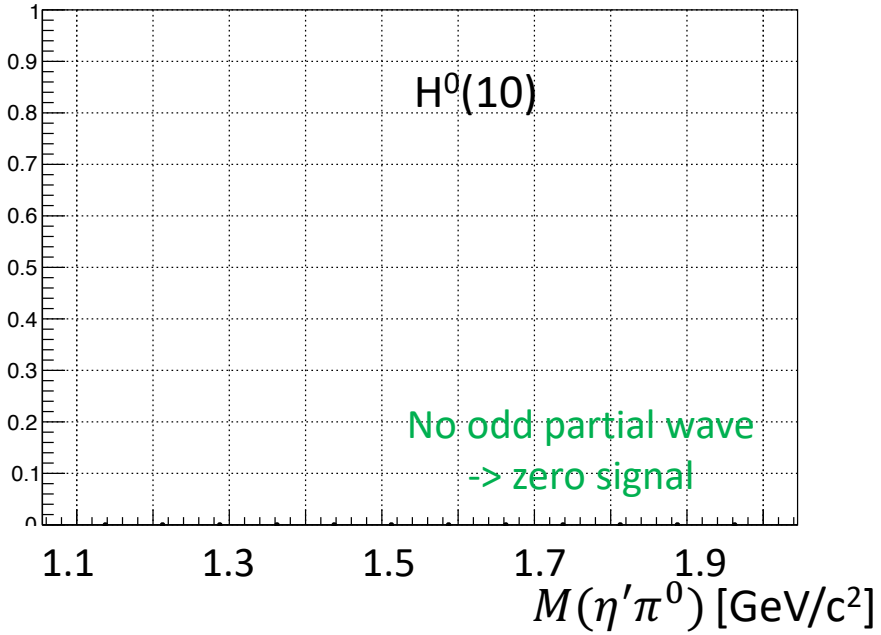


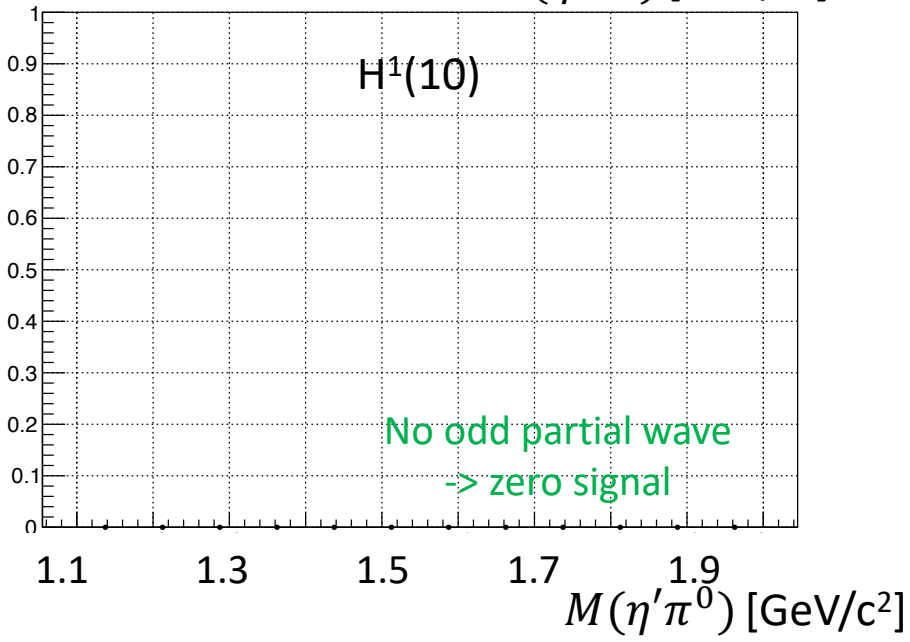
Moments calculated using fitted partial waves

0.1<t<0.7 (GeV/c)^2 Uncertainties from bootstrapping









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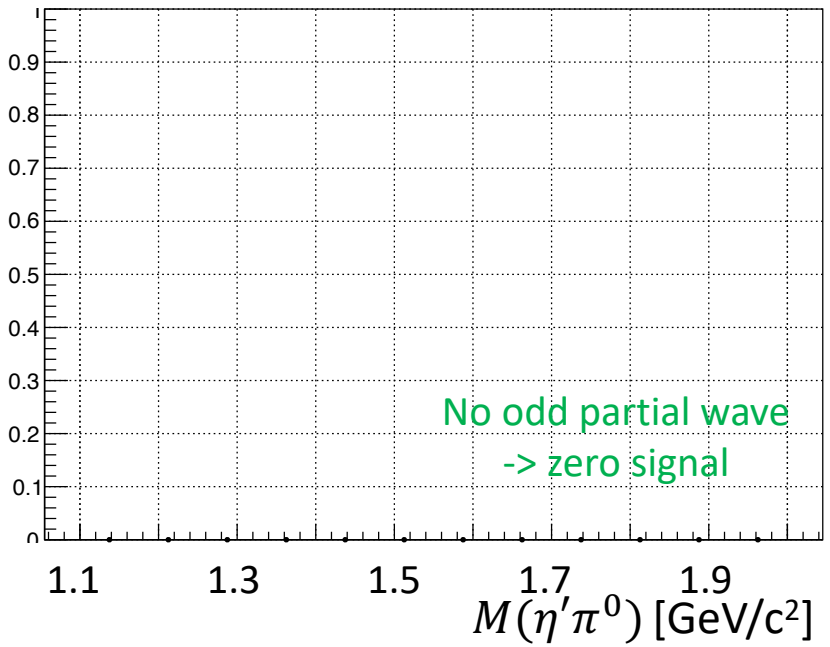

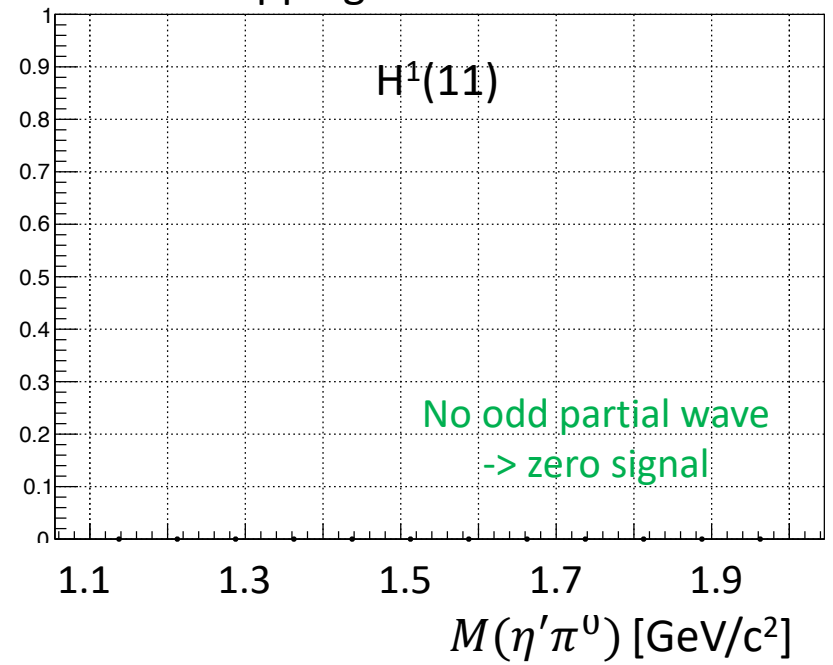

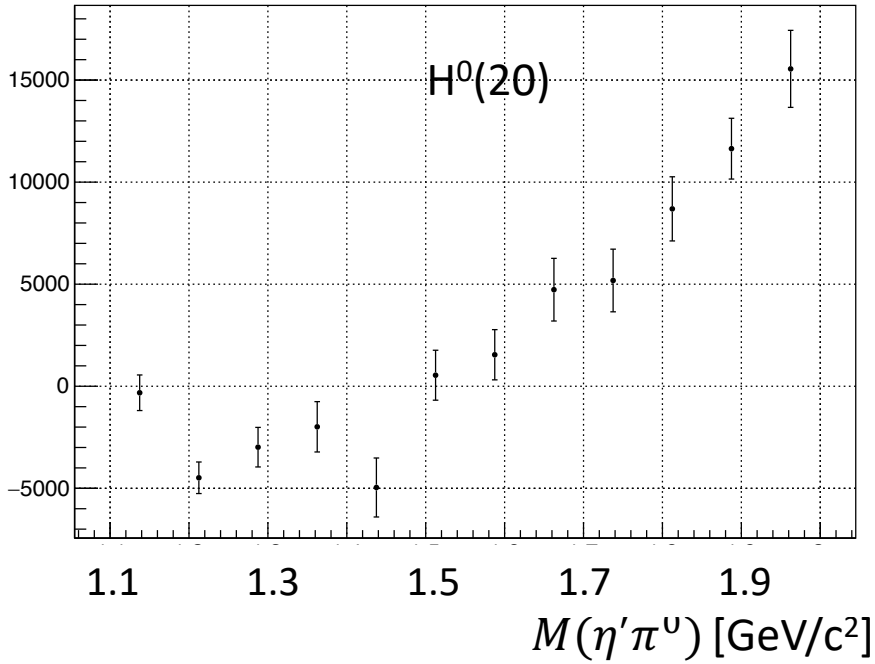

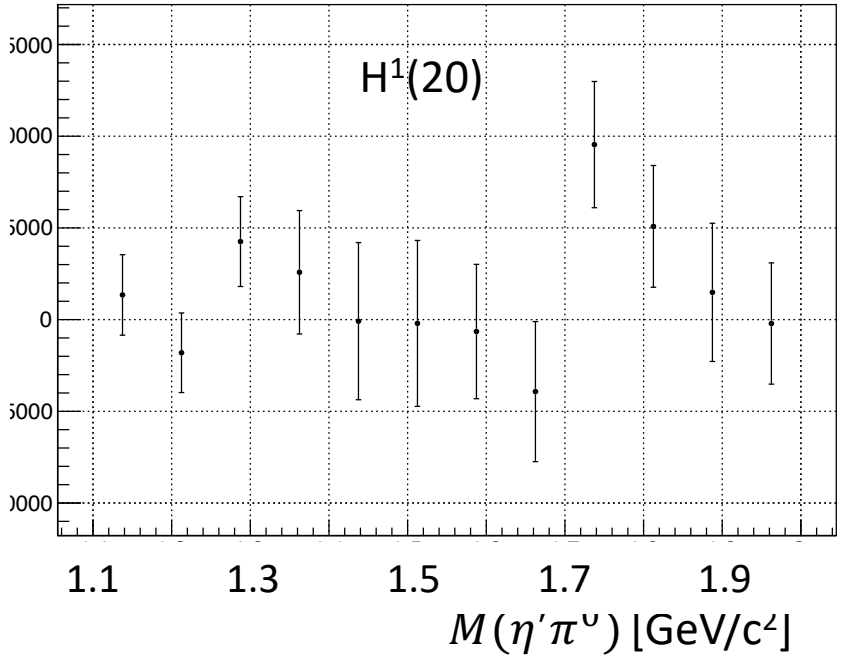

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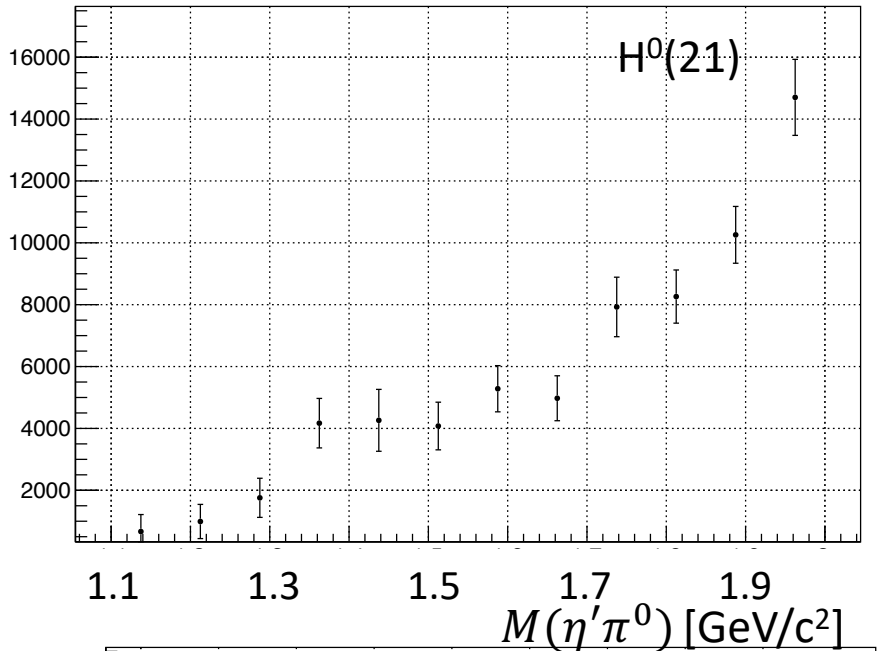

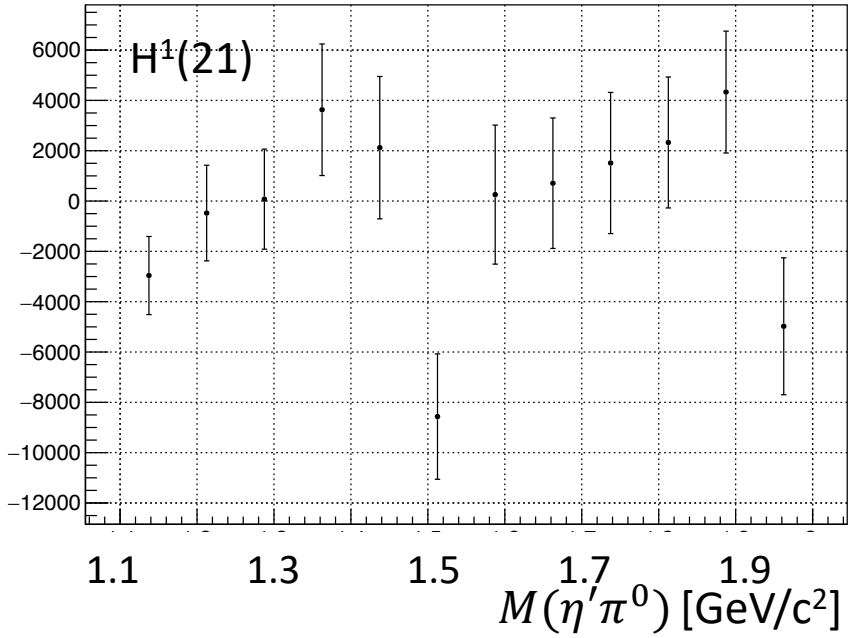

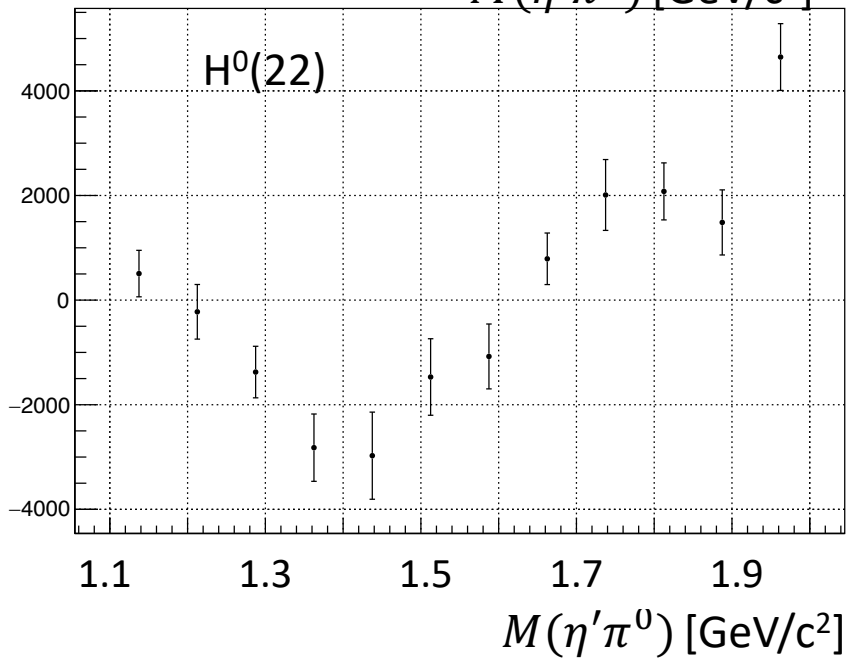

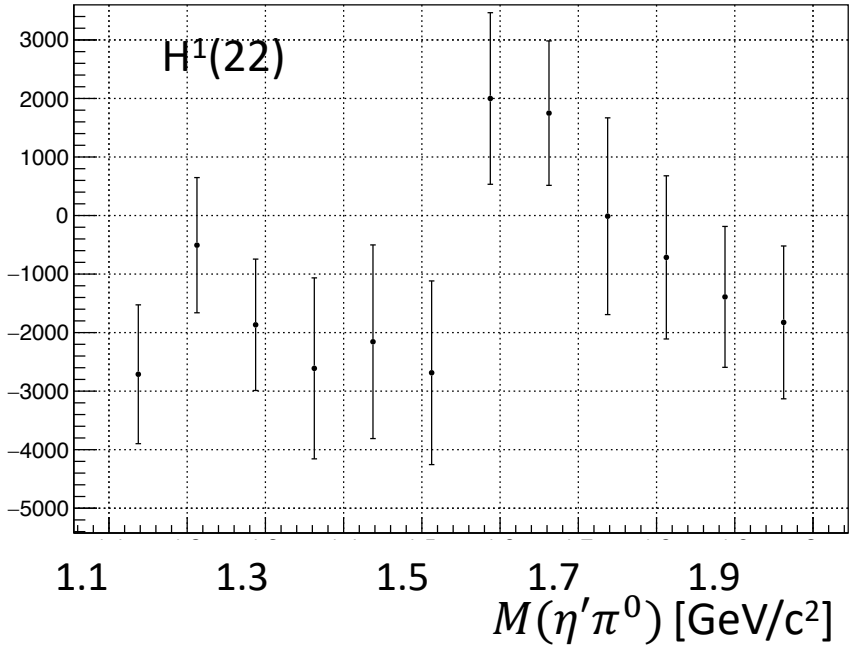

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