



$K\pi$ -production using LASS parametrization

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K π -Production

- Use K π -production of LASS (Nuclear Physics B133 (1978) 490-524) to study the K π final state in the reaction KL p \rightarrow KS π n w/ assuming that the cross-section is similar to the cross-section of the charged kaon reaction K p \rightarrow K π n.
- The t-dependent parametrization of the naturality amplitude L_λ^{+-} for the production of a K π state of invariant mass $m_{K\pi}$, center-of-mass momentum q, angular momentum L, and t-channel helicity λ , by natural (+) and unnatural (-) parity exchange:

$$L_0^+ = \frac{\sqrt{-t}}{m_\pi^2 - t} G_{K\pi}^L(m_{K\pi}, t), \quad L_1^- = \sqrt{\frac{1}{2} L(L+1)} G_{K\pi}^L(m_{K\pi}, t) \gamma_c(m_{K\pi}) \exp(b_c(m_{K\pi})(t - m_\pi^2))$$

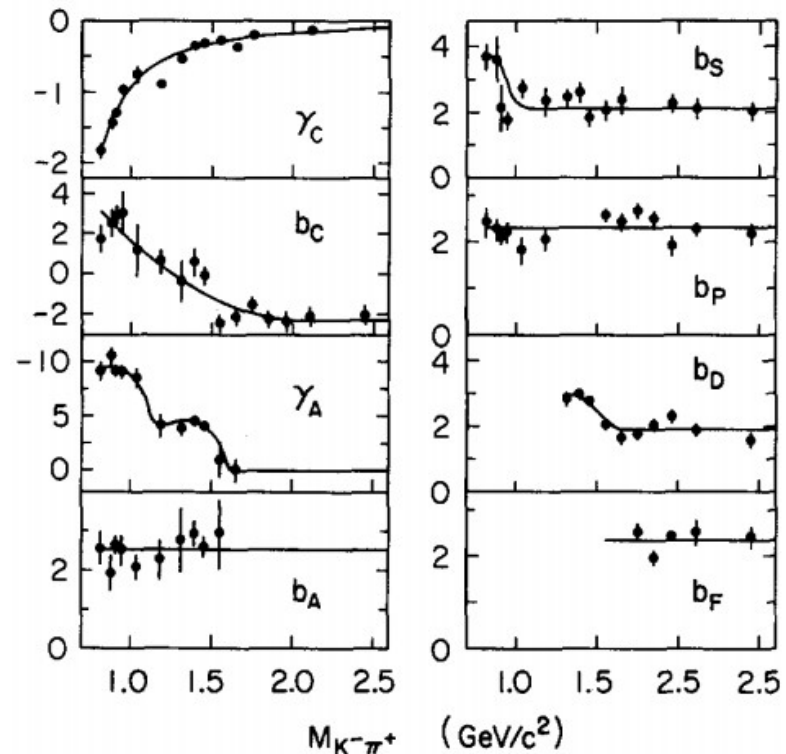
$$L_1^+ = \sqrt{\frac{1}{2} L(L+1)} G_{K\pi}^L(m_{K\pi}, t) [\gamma_c(m_{K\pi}) \exp(b_c(m_{K\pi})(t - m_\pi^2)) - 2i \gamma_a(m_{K\pi}) \exp(b_a(m_{K\pi})|t'|)(t - m_\pi^2)]$$

$$L_\lambda^{+-} = 0, \quad \lambda \geq 2 .$$

$$G_{K\pi}^L(m_{K\pi}, t) = N \frac{m_{K\pi}}{\sqrt{q}} a_L(m_{K\pi}) \exp(b_L(m_{K\pi})(t - m_\pi^2)), \quad a_L^I = \sqrt{(2L+1)} \epsilon^I \sin \delta_L^I e^{\delta_L^I}$$

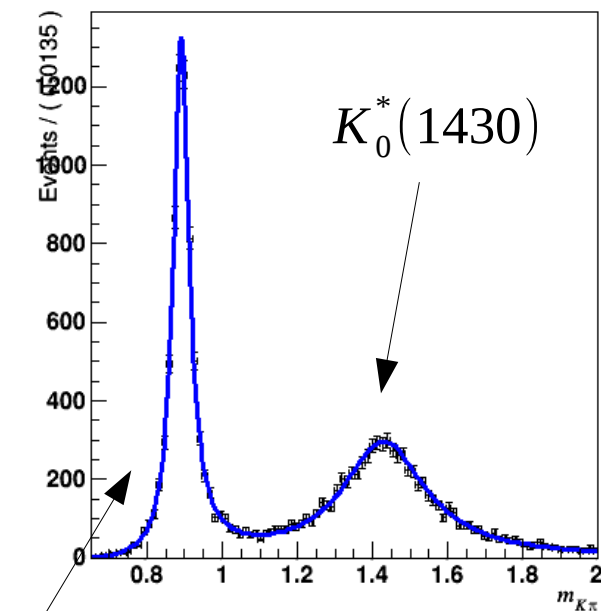
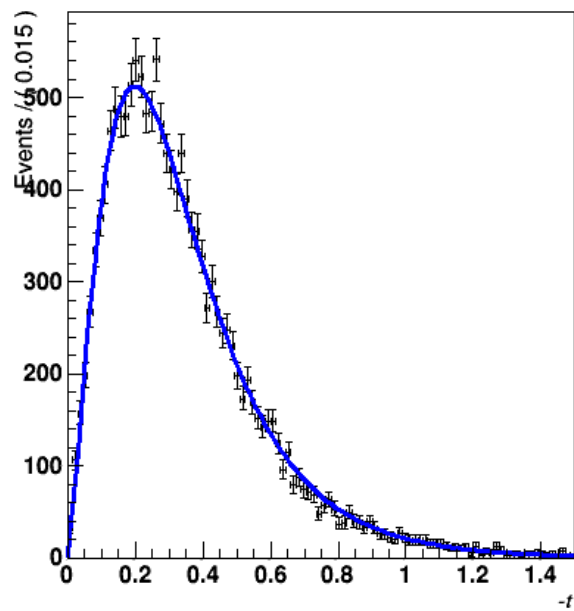
$K\pi$ -Production

- The parameters $\gamma_c, b_c, \gamma_a, b_a, b_L$ are mass-dependent and are determined by fitting the data in each mass interval.
- Assumed constant in the following simulation. To be parametrized in the next update.

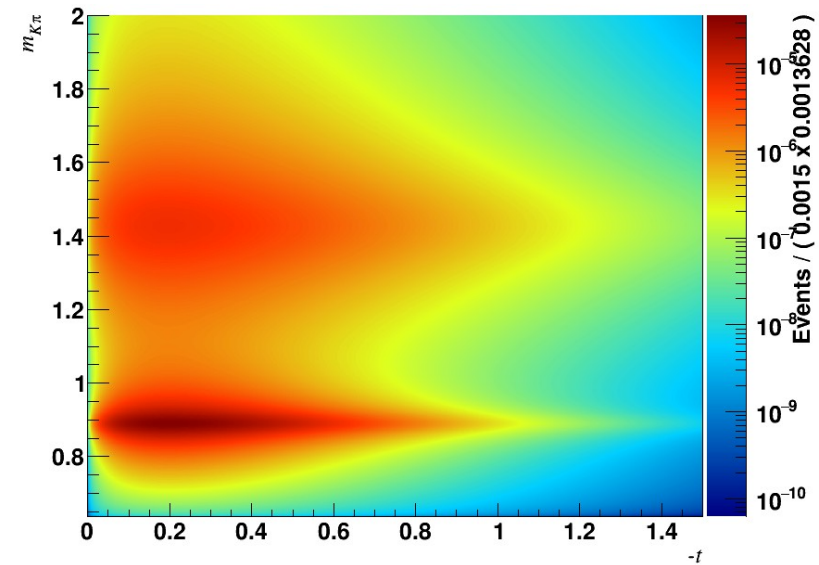


$K\pi$ -Production

- Monte-Carlo simulation of $K\pi$ -production using LASS model:



$K^*(892)$



Outlook

- Update the simulation tool:
 - ➔ Fix the issue of normalization.
 - ➔ Include Estabrooks parametrisation for the $K\pi$ -Swave.
 - ➔ Model the mass-dependent parameters
- Constrain the t variable from the reaction $K_L p \rightarrow K^0 \pi n$.
- Simulate the events in GlueX detector.

Thank You!