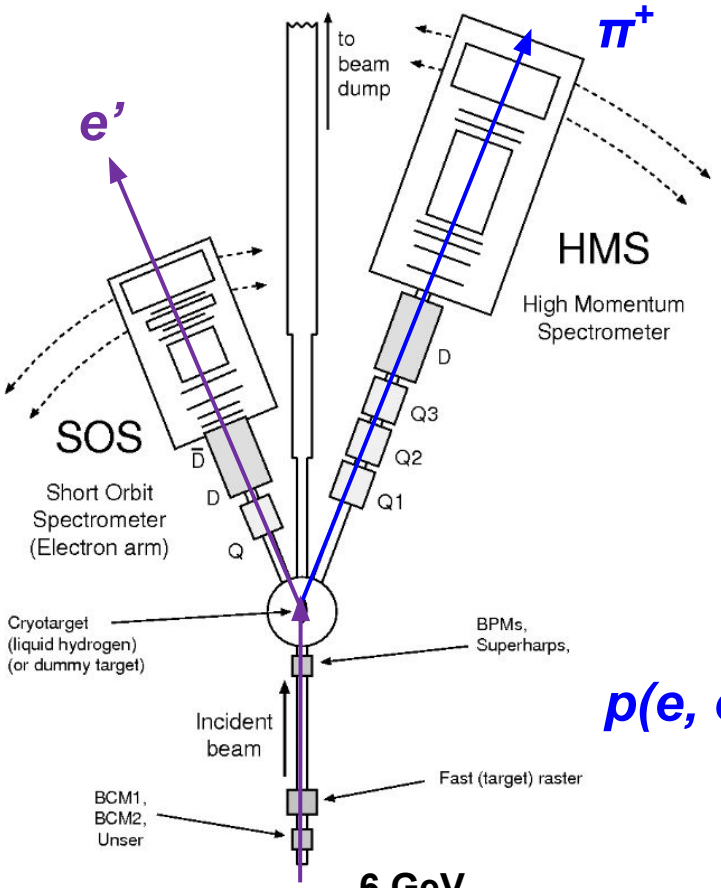
DEMP Generator

April 25th, 2023

Why do we need one more generator?

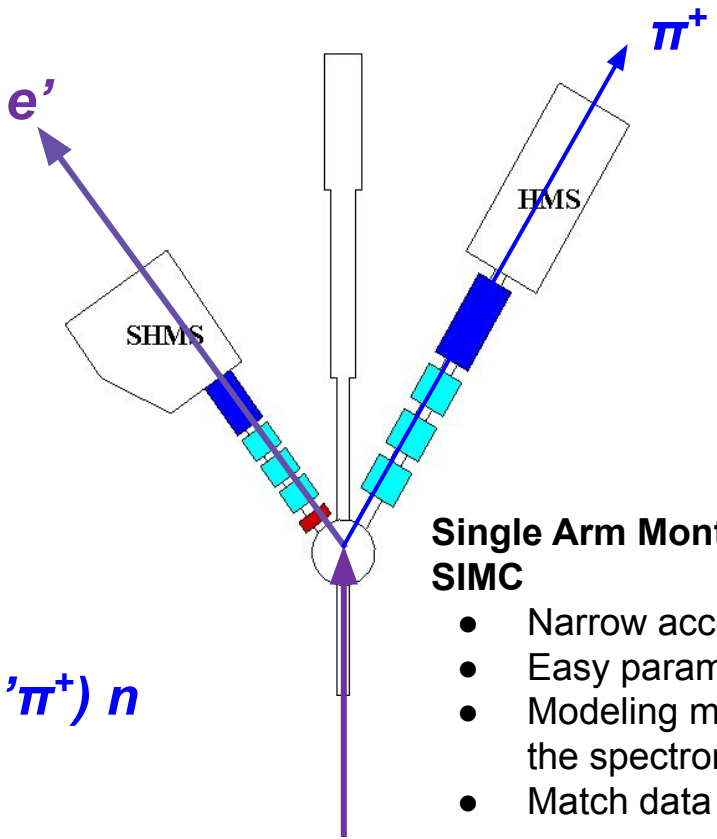
- Exclusive meson production
- Provide data driven L/T separated cross section
- Bridging between JLab 6, 12, SoLID, and EIC

Origin of the DEMP Generator



6 GeV

$p(e, e'\pi^+) n$

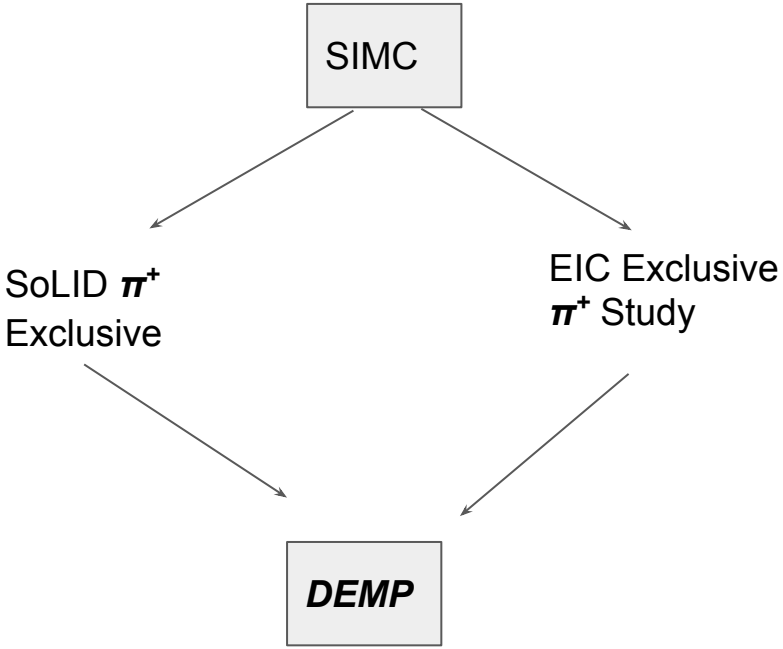


12 GeV

Single Arm Monte-Carlo at Hall C: SIMC

- Narrow acceptance
- Easy parameterizing model
- Modeling multiple scattering within the spectrometer
- Match data at few percent level

DEMP Evolution



https://github.com/JeffersonLab/DEMPGen

Upcoming Paper

DEMPgen: Physics event generator for Deep Exclusive Meson Production at Jefferson Lab and the EIC

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(Dated: April 25, 2023)

Background: Measurements of exclusive meson production are a useful tool in the study of hadronic structure...

Purpose: To study the transition between non-perturbative and perturbative Quantum Chromodyanmics...

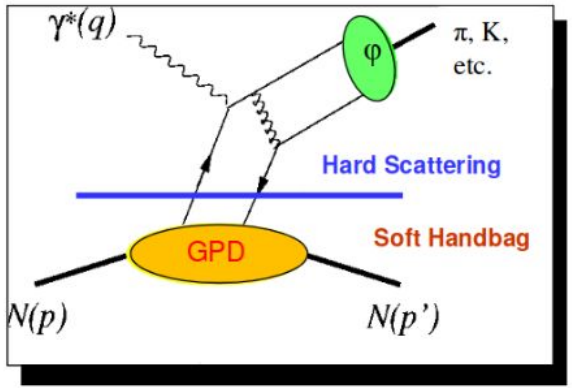
Method: We have written a physics generator...

Results:

Conclusion: Garth will draft an abstract.

I. INTRODUCTION

We have written a Deep Exclusive Meson Production (DEMP) event generator (DEMPgen), which is modular in form, so that the variety of reactions it simulates can be expanded over time. The motivation for the writing of the event generator is to evaluate the feasibility of hadron structure studies with polarized targets at Jefferson Lab (JLab), and with colliding beams at the Electron-Ion Collider (EIC).



Currently DEMP Capability

- Exclusive pion, Kaon electroproduction
- u-Channel pi0 electroproduction

Current issues

- **Energy and Momentum Conservation Issue**
  - K-lambda and K-sigma final state
- Generator phasespace discretization
  - Detail will be covered soon