

# Goals and Status of the Hall D SRC/CT Experiment (E12-19-003)

Axel Schmidt

George Washington University

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# Goals of the experiment

Probe nucleon-nucleon **short range correlations** (SRCs) and search for **color transparency** using a range of photoproduction reactions on nuclei.

- $\gamma p \rightarrow \pi^0 p$
- $\gamma p \rightarrow \rho^0 p$
- $\gamma p \rightarrow \omega p$
- $\gamma n \rightarrow \pi^- p$
- $\gamma n \rightarrow \rho^- p$
- $\gamma n \rightarrow \pi^- \Delta^+$
- ...
- ...

## Short Range Correlations

- Events with large missing momentum
- Look for additional nucleon balancing missing momentum

## Color Transparency

- Need events pushing to large  $|t|$

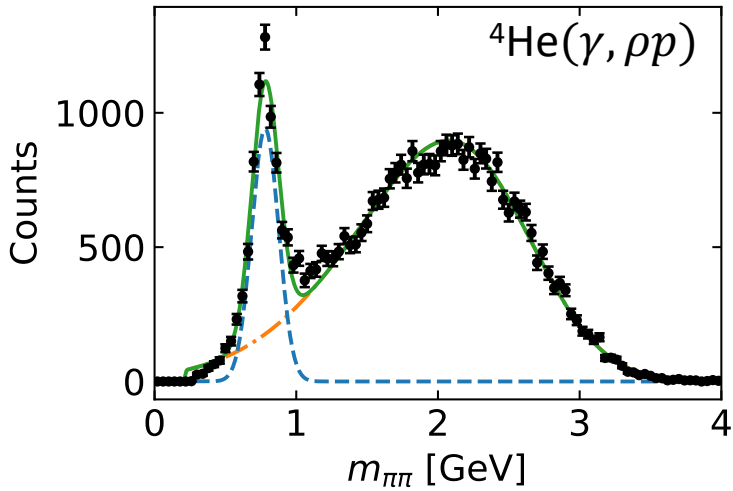
Summary of PAC days

Target	Approved (12 GeV)	Corrected* (10.8 GeV)	Collected as of Dec. 6 <sup>th</sup> (10.8 GeV)
D	2	3.2	1
He-4	5	8	5
C-12	5	8	5.5
<b>Totals</b>	<b>12</b>	<b>19.2</b>	<b>11.5</b>

\* Flux reduction factor of 1.6 in range of interest (8–9 GeV) due to lower energy

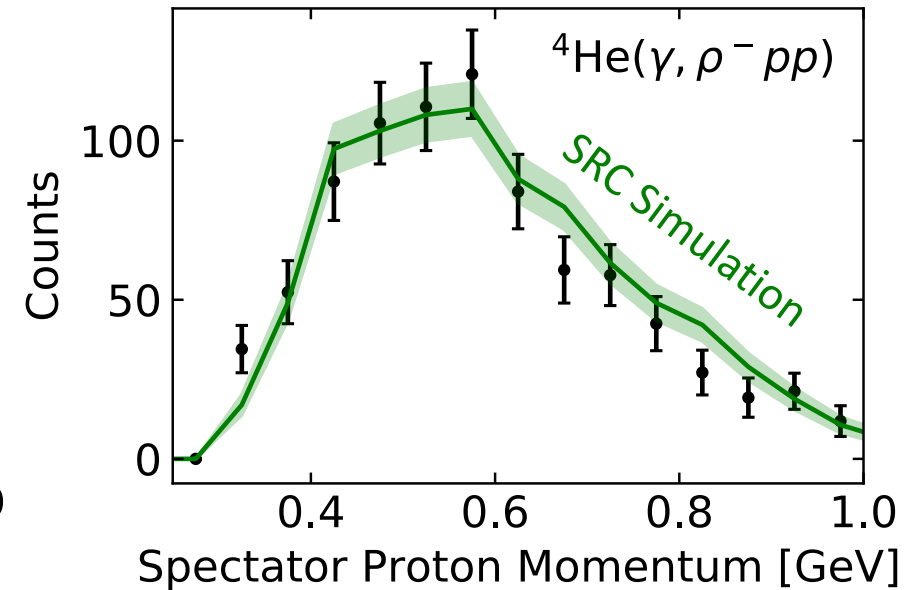
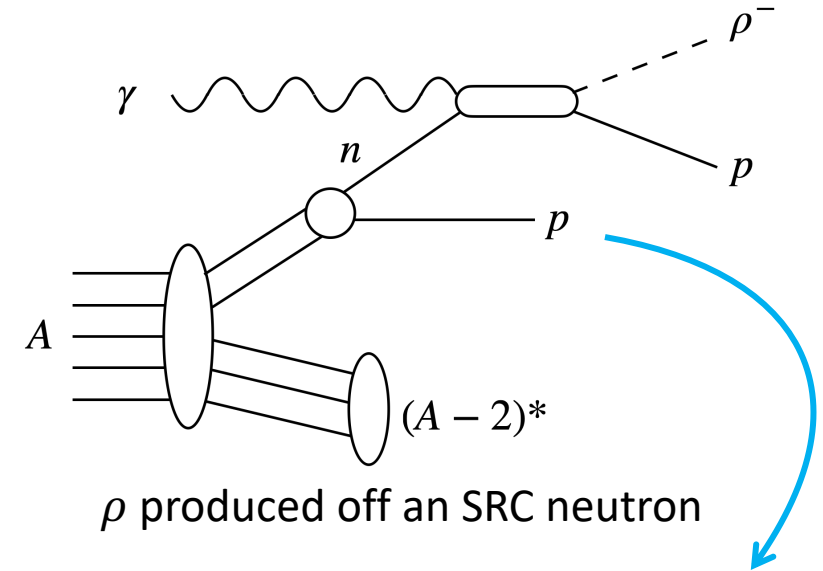
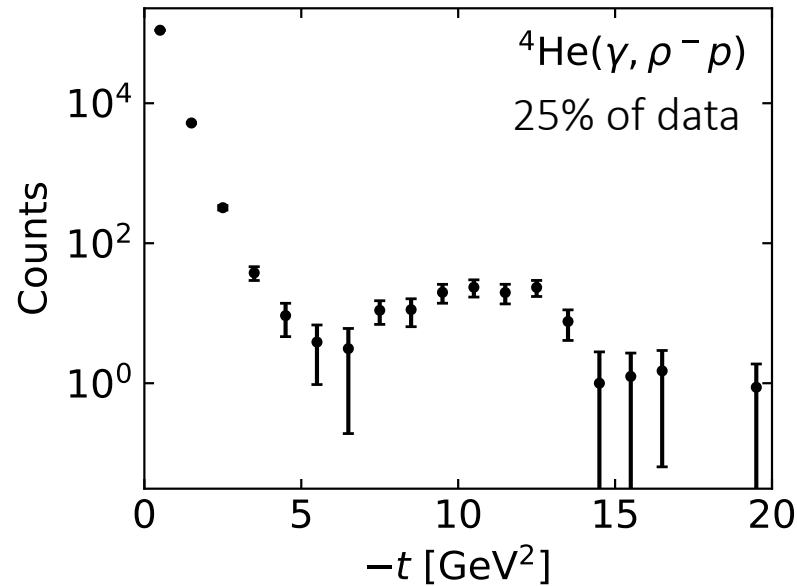
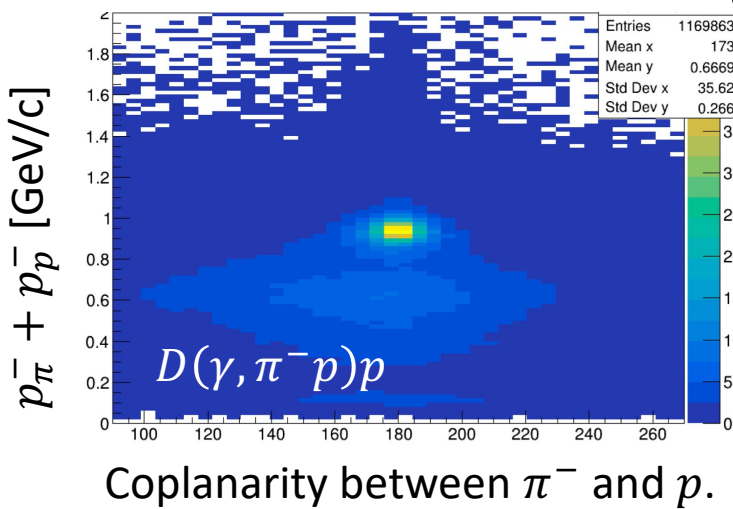
# Data collected so far

Correlated spectator protons show expected momentum distribution.

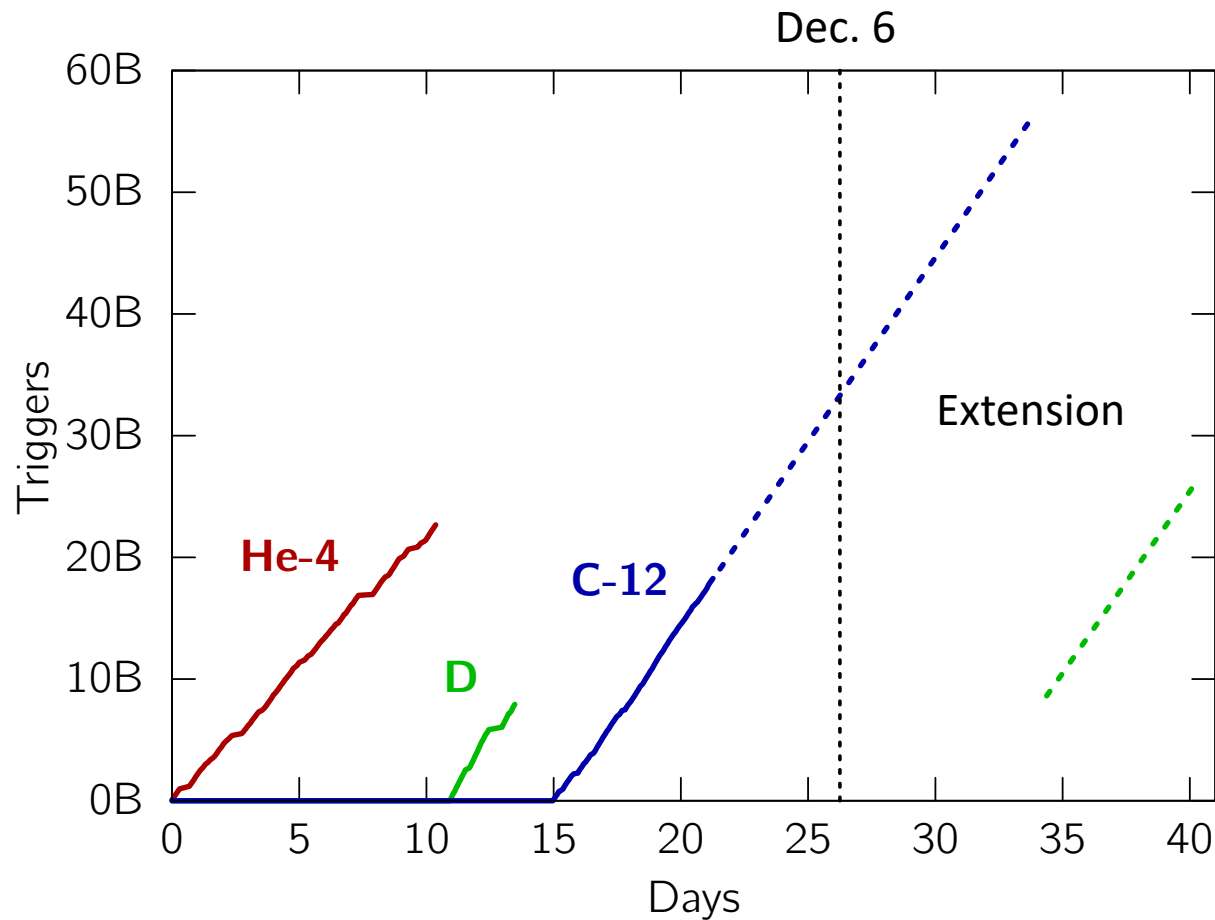


Signal can be isolated from bkg. in multiple channels.

$|t|$  distribution extends past  $|t| > 10 \text{ GeV}^2$ .



# Anticipated Data



Plot comparing accumulated statistics in  $\rho^0 p$  or  $\pi^- p$  channel compared to proposal.

Ideally a t-distribution.

## Plan for the extended time

- One additional week on the carbon target to reach proposal statistics
- Switch back to liquid target cell to collect more data on deuterium