Simulation Requirements

Parameter	ρ^0 CT: acceptance	ρ^0 CT: background channels	$\pi^\pm$ SIDIS	π^0 SIDIS (Preliminary)
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Physics channel	$e + A \to e' + \rho^0 + X$, $\rho^0 \to \pi^+\pi^-$, plus Δ^{++}, Δ^0, non-resonant $\pi^+\pi^-$ (mixed sample)	Δ^{++}, Δ^0, non-resonant $\pi^+\pi^-$ (one sample per channel)	$e + A \to e' + \pi^\pm + X$	$e + A \to e' + \pi^0 + X$, $\pi^0 \to \gamma\gamma$
Event generator	`EAVM_RGD`	`EAVM_RGD`	`nucsidisgen` (PYTHIA 6 based)	GiBUU
Beam energy	10.54 GeV	10.54 GeV	10.54 GeV	10.54 GeV
Targets	LD_2, C, Cu, Sn	LD_2, C, Cu, Sn	LD_2, C, Cu, Sn	LD_2, C, Cu, Sn
Polarities	Inbending and outbending	Inbending and outbending	Inbending and outbending	Inbending and outbending
Events per target	100M*	18M**	500M†	0.70B***
Events per polarity (all targets)	400M	72M	2.0B	2.8B
Total generated events	800M	144M	4.0B	5.6B
Events per job	5,000	5,000	5,000	5,000
Total simulation jobs	160k	28.8k	800k	1.1M
Benchmark computing time	≈2.93 core-hours per 5,000-event job (with background merging)	≈2.93 core-hours per 5,000-event job (with background merging)	≈2.28 core-hours per 5,000-event job (preliminary)	Pending
Calculated computing	≈469k core-hours	≈84.4k core-hours	≈1.82M core-hours	Pending
Requested computing	≈500k core-hours	≈90k core-hours	≈2.0M core-hours	Pending
Estimated storage	≈3.2 TB	≈0.6 TB	≈16 TB (preliminary)	Pending

*Assuming 6 $Q^2 \times 4$ $t \times 4$ z bins with ≈1M generated events per bin; these numbers might change. In the mixed sample generated with `EAVM_RGD`, the ρ^0 fraction drops from ≈87% at $1 < Q^2 < 2$ GeV^2 to ≈48% at $3 < Q^2 < 5$ GeV^2, so keeping the same number of ρ^0 per bin would require more events at high Q^2.

**Assuming 6 Q^2 bins with ≈1M generated events per bin.

†Assuming 13 (x_B, Q^2) regions × 4 z × 3 p_T^2 bins.

***Estimated from the π^0 yield in data (LD_2, outbending, run 18431); our current analysis binning is 8 Q^2 × 7 x_B × 10 z × 6 p_T^2 (4D bins), so these numbers might change.

- On the EAVM_RGD generator only the final-state particles of the selected channel are passed to GEMC, so no additional event filtering is needed before simulation.

- nucsidisgen produces inclusive DIS events with all final-state particles, and the charged-pion channels are selected in the analysis. Selecting only events with π^+/π^- may reduce the computing time and storage.