## Inclusive Reactions Summary

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March 21, 2020

## Critical Channels for Detector Development

- The inclusive group covers a large set of physics interests, ranging from gluon helicity to nuclear PDFs and non-linear dynamics.
- Parity violating (A<sub>PV</sub>) and charged current (CC) channels were singled out, both for high scientific interest and stringent detector requirements.
  - 1. Inclusive  $A_{PV}$  Sensitive to  $\Delta s^+(Q^2)$  and  $s^+(Q^2)$ , but small signal requires high precision measurement.
  - 2.  $\sigma^{CC}_{r}$  allows flavor separation at high x for dbar/ubar, but reduced cross-section requires reconstruction of Q<sup>2</sup>, x from hadronic recoil.



These channels, as well as those requiring heavy quark tagging, motivate a two IR EIC configuration.
 This group supports a two detector configuration to confirm these flagship measurements.

## Workflow Details

- Due to time constraints group decided to utilize existing MC data sets and pursue reweighting techniques.
- Theoretical groups will provide interpolation tables of cross-sections in LHAPDF format.
- Experimentalists will work on implementing handbook resolutions and Kaon PID from detector WG into modules for EIC smear.
- Goal is to utilize people currently doing reconstruction and close the loop on at least one channel by Pavia meeting.
- May need to utilize rejection sampling path for channels where pseudo-data does not exist, or in case of biases in reweighting.



## Action Items and Questions

- Form a list of existing simulation samples that are available for analyzers
- Put this list, along with other pertinent information on Wiki page
- Inquire about data staging and repository. Where do we store data before pushing through EIC smear? Where do we store smeared data?

Measurement	Main Detector Requirements	Anticipated Plot	Physics Topic/goal	Responsible persons	Additional Comment
$A_{\parallel}, A_{\perp}$ for $p, d,$ <sup>3</sup> He	Standard inclusive	$A_{\parallel}, A_{\perp}, g_{1,2,\perp}, \Delta g$	Gluon & Quark Helicity and HT	TBA	Global fit with SIDIS?
$A_{\rm PV}^e, A_{\rm PV}^h$ for $p, d$	Standard inclusive	$A^{e}_{\rm PV}, A^{h}_{\rm PV}, F^{\gamma Z}_{2,3}, g^{\gamma Z}_{1,5}, F^{W^{-}}_{2,3}, g^{W^{-}}_{1,5}, (\Delta)s^{+}$	Pol. & Unpol. strange	TBA	Will SIDIS do the Kaon tagging channel?
$d\sigma^{\rm NC}/dxdy$ (inc, HQ) for $p, d$	Standard inclusive + heavy quark	$ \begin{array}{l} \sigma_{\mathrm{red}}^{\mathrm{inc.,HQ}},  F_{2,L}^{\mathrm{inc.,HQ}},  g, \\ d/u \end{array} $	Proton PDFs	TBA	Global fit with SIDIS?
$d\sigma^{\rm NC}/dxdy$ (inc, HQ) for A	Standard inclusive + heavy quark	$\sigma_{\mathrm{red}}^{\mathrm{inc.,HQ}}, F_{2,L}^{\mathrm{inc.,HQ}}, F_{2}^{A}/F_{2}^{N}, g,$	Nuclear PDFs	TBA	
$d\sigma^{\rm NC}/dxdy$ (inc) for $p, A$	Standard inclusive	$\sigma_{\rm red}^{\rm inc.,HQ}, F_{2,L}^{\rm inc.,HQ}$	Non-linear QCD dynamics	TBA	Global fit with SIDIS?
$A^e_{\rm PV}$ for $d$	Standard inclusive	$\sin^2( heta_W)$	BSM & precision EW physics	TBA	Need ~100 fb <sup>-1</sup> CLFV via $e \rightarrow \tau$ ?
$d\sigma^{ m NC}/dxdyd\phi$	Standard inclusive	Updated Fig.6 in PhysRevD.98.115018 for CM energies smearing	Lorentz and CPT Violating Effects	Lunghi and Sherrill	