# Jet and Precision Physics at LHC and EIC 

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Snowmass Theory Frontier Kickoff meeting

## Lessons from the LHC

- A great success, partly due to QCD
- Helps to develop tools to handle data:
- Jets, substructural observables, grooming techniques, $\cdots$
- Precise predictions of data
- Multiloop
- IR subtraction schemes: Antenna subtraction, N -jettiness, $\cdots$
- Resummation: SCET, Parton shower, …


## Impacts on the EIC related topics



Proton polarization, Collins function Sivers function

Jets/substructures

Heavy ion


Mostly only focus on the application of jet as new probes. Precision?


## Possible Directions



Small exp. errors


## TMD/Spin Physics:

N2LO, N3LO DIS+Jet Boughezal, et al., Currie, et al.
NLO, N2LO longitudinal polarized DIS Hinderer et al., Boughezal et al., Borsa et al. Several Resummations to N3LL Kang, Lee, Stewart et al., Li, Vitev, Zhu, + ...
closely related to the qT distribution of Drell-Yan/ggH at the LHC
Transverse polarization? QCD/SCET power correction program, shed lights on the non-perturbative corrections?

Small-x/forward scattering physics:
Most calculations are at LO within Color Glass Condensate
LFPT, kinematic constraints put in by hand
A framework for higher order corrections with covariant QCD? SCET + CGC or CGC from SCET Kang, XL, 19, Kang, Liu, XL, 20
Anything to say about MPI at LHC or future hadron colliders?

## Possible Directions



## Heavy Ion:

Jet fragmentation function + Non-perturbative models Qiu, et al. SCET-G Vitev, et al.

Better control of the perturbative part of the jet-medium interaction?
EIC White Paper

Convert the EIC program to a QCD Precision Program

- Similar to the PDF global fitting at the LHC
- Apply the LHC FO+Resummation techniques to EIC
- Shed light on the non-perturbative power corrections, forward physics required by precision physics

