

Update on MC-Data Validation Group Activities

Prabhakar (Prabi) Palni (on behalf of MC-Data Validation Group)

School of Physical and Applied Sciences (SPAS)

Goa University



MC-Data Validation Group Goals

- Primary goals of MC-Data Validation:
 - Study global properties of leptonic and hadronic final states in DIS events using various MC Event Generators (MCEG).
 - Compare and understand the results from the MCEG with the existing HERA data
 - Provide initial findings and results in a EICUG report which will give an overview of where we stands in terms of understanding previous DIS data with current physics implement in MCEGs
 - Propose (or develop) additional physics and additional models for different observables at EIC energies
- Present activities:
 - Validation of various RIVET analyses (from H1 and ZEUS) motivated by DIS physics
 - Writing of new analyses and modify existing ones for new DIS studies/observables
 - Use Pythia8, Herwig7, POWHEG, and Sherpa2 MC generators to compare with H1/ZEUS data
 - Also used POWHEG and Sherpa2 NLO results to compare with HERA Data

MC-Data Validation Group Participation

- Groups contributing these efforts are following
 - EIC-India: Akal University, DAVC, IIT Bombay, IIT Delhi, IIT Indore, IIT Madras, and IIT Patna, MNIT Jaipur, Punjab University, Goa University
 - MCNet: Christian Bierlich, Ilkka Helenius, Simon Plätzer

MC-Data Validation Group Activities

- Ongoing RIVET analyses:
 - Transverse energy-energy flow at HERA (H1)
 - Charged particle multiplicities and transverse momentum spectra in DIS at HERA (H1)
 - Differential cross-section of J/ψ , ϕ , & D^* meson production at HERA (H1 & ZEUS).
 - Diffractive Dijets photo-production at HERA (H1 & ZEUS)
 - Inclusive-jet photo-production and determination of α_s at HERA (ZEUS)

MC-Data Validation Group Selected Results

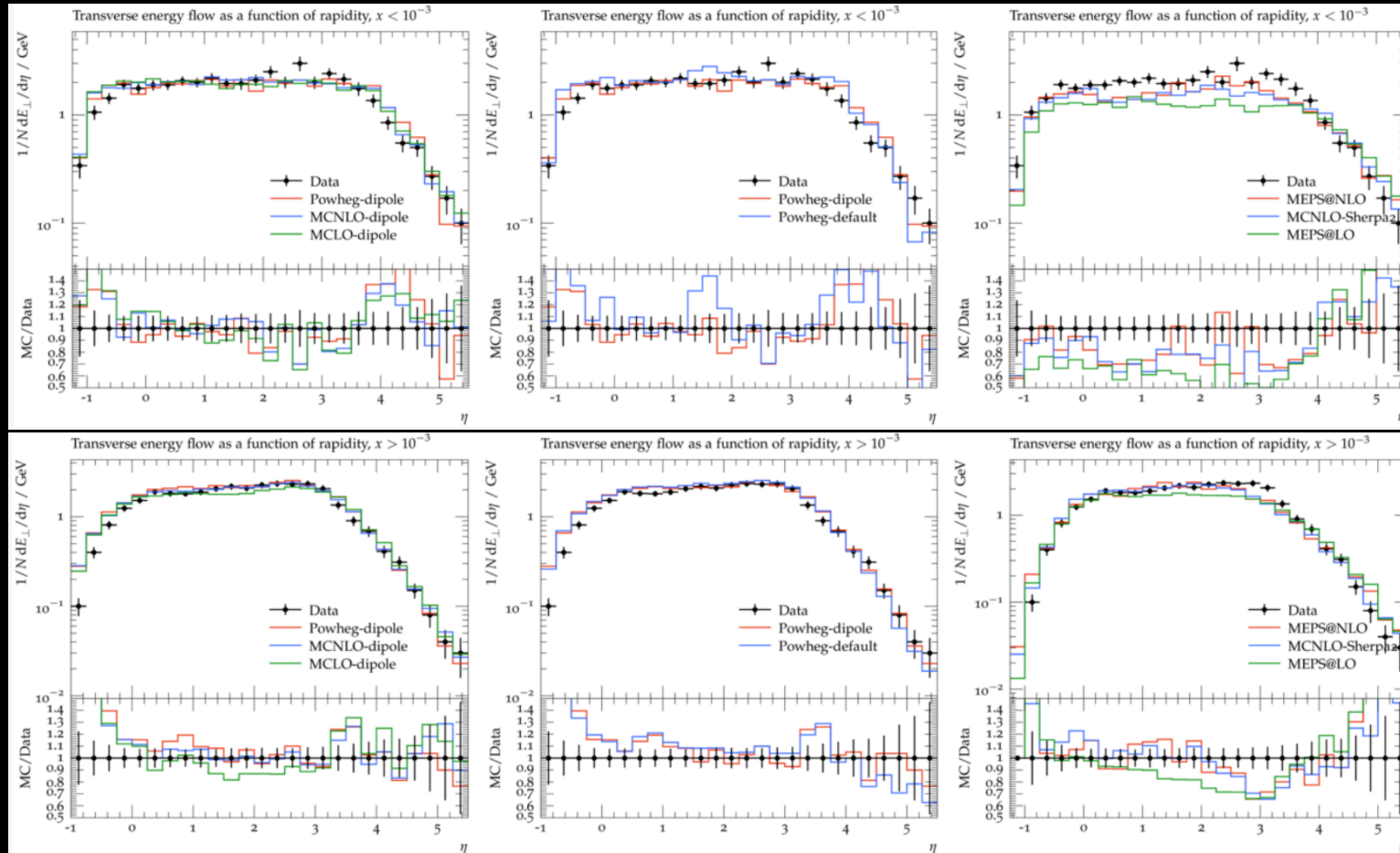
- Transverse energy-energy flow results using NLO

$x < 10^{-3}$

Herwig7

Powheg

Sherpa2

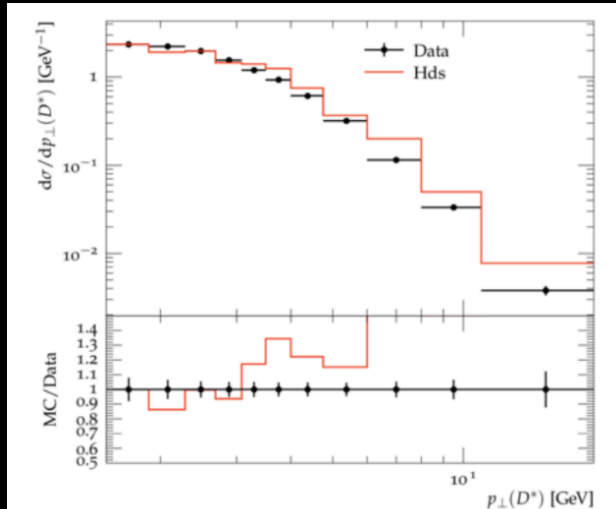


$x > 10^{-3}$

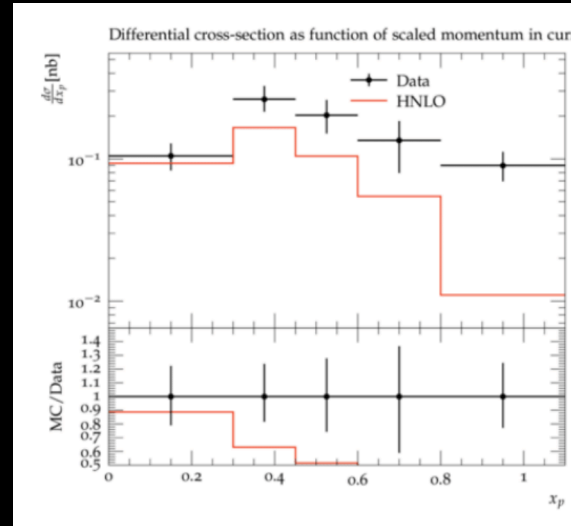
MC-Data Validation Group Selected Results

- (D^* & ϕ) Mesons, inclusive jets and Dijets photoproduction results

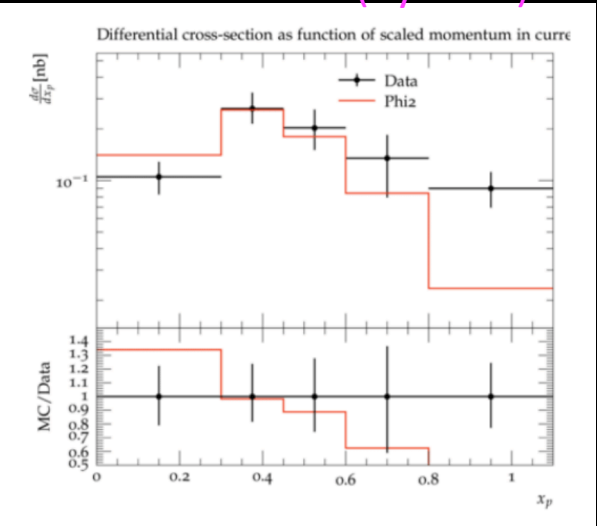
D^* meson (Herwig7)



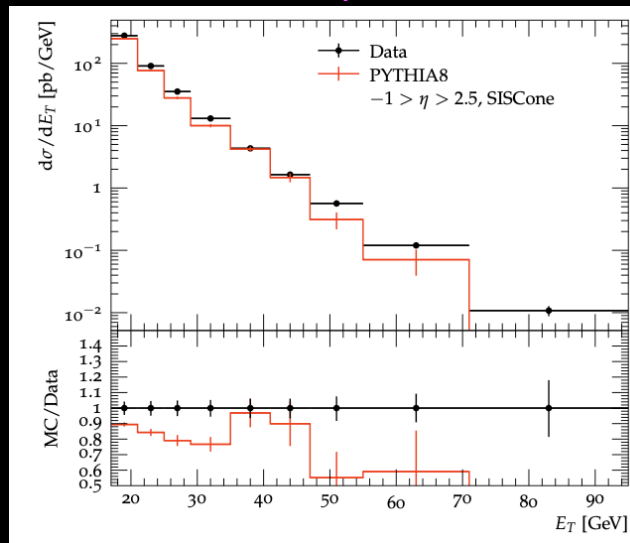
Phi meson (Herwig7)



Phi meson (Pythia8)



Inclusive Jet production



Dijets photoproduction

