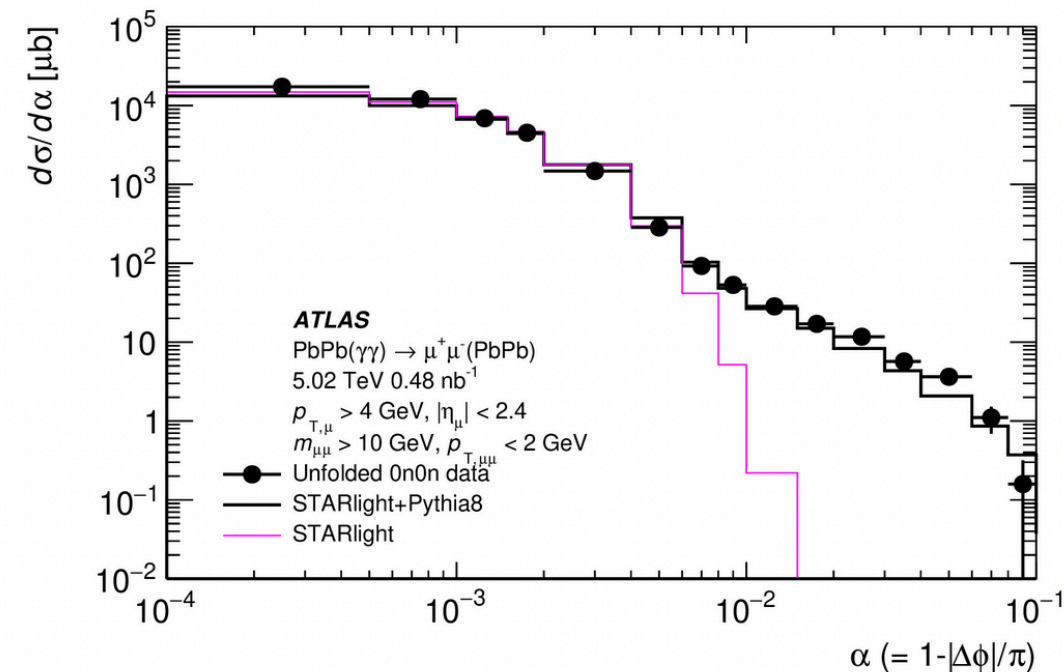


Tuning discussion points

Oldrich Kepka (FZU), Simone P. Griso (LBNL)

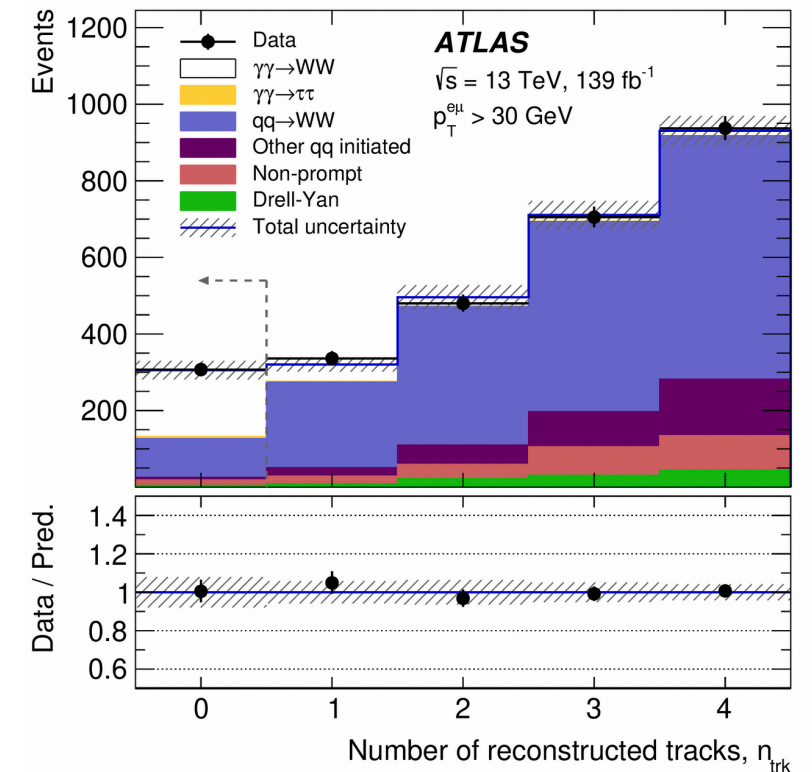
Elastic production

- Well understood for pp - 1 % precision for LuxQED, ChFF/EDFF
significant differences in PbPb
- FSR modelling important (Photos, Pythia, Herwig)
- Are full NLO QED/EW corrections important or real contribution sufficient?
 - Profit from machinery in MG5_AMC@NLO, Sherpa
- Limitation of generator interfaces to pass photon pT
- Survival effects have small uncertainties
- Easy to isolate in data with tracks and proton tag. Should measure across large mass spectrum



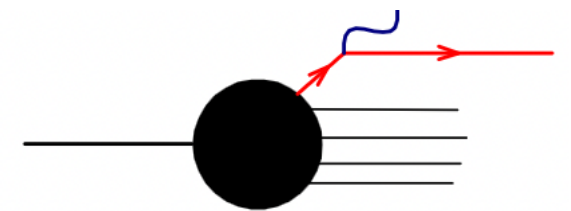
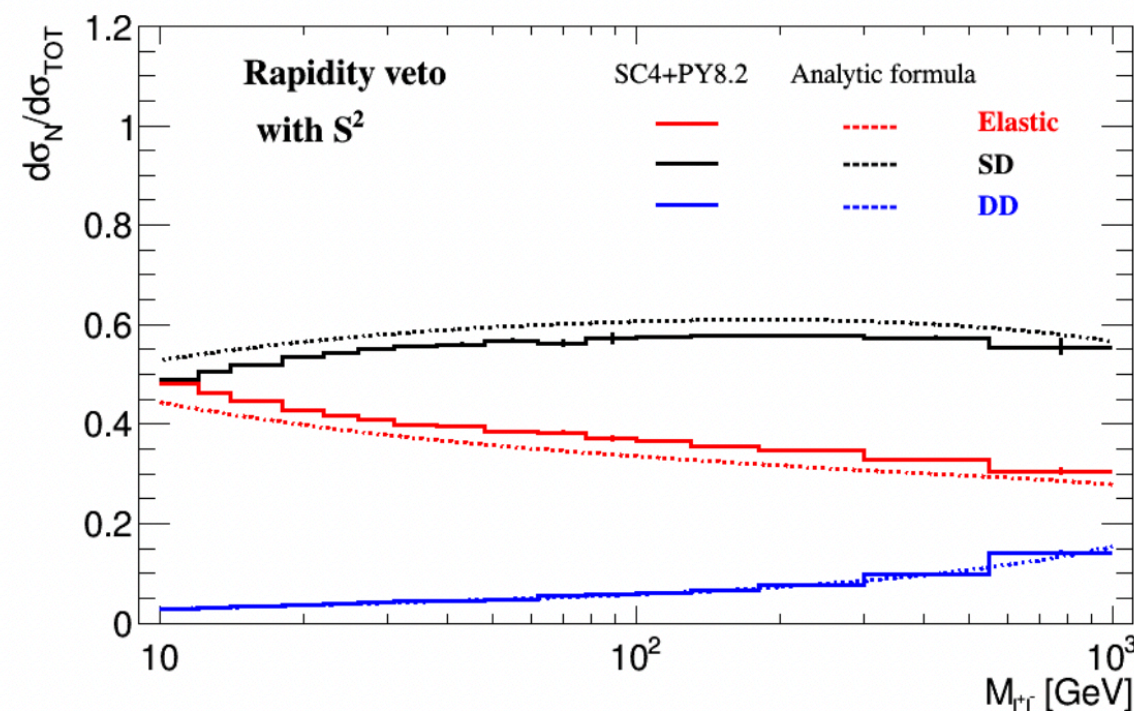
Single-dissociation

- What needs to be described?
 - Lepton kinematics - $p_T(l)$, acoplanarity(l), ...
 - charged particle distribution used in measurements
 - intact proton kinematics
- Much more involved to get the shower algorithms to break the right proton and keep the other intact
 - dipoleRecoil = ON not to have interactions between beams Pythia
- Experimentalists need to reliably estimate uncertainties which are associated with event selection
 - Variation of shower parameters (p_{Tmatch} , p_{Tdump} , ...), tuning primordial k_T no more needed Q2 dependent flux implemented in Pythia8, but needed in case of MG?
 - DIRE, VINCIA, Herwig, Sherpa
- Getting a clearer picture what variations are important is a good start



Single-dissociation - Survival factor

- Survival factor - analysis of showered events well reproduces vetos imposed on final state quark
 - Are data described activity vetos use objects which are more susceptible to the details of the showering (tracks/gaps of certain pT)?
- Superchic has the most complete description of SF
- What is the best way to use Survival Factors in other generators?
 - Feasible to implement Survival Factor in multipurpose generators?
 - Experimentalist re-weight samples to Superchic to derive corrections



Single-dissociation - tuning

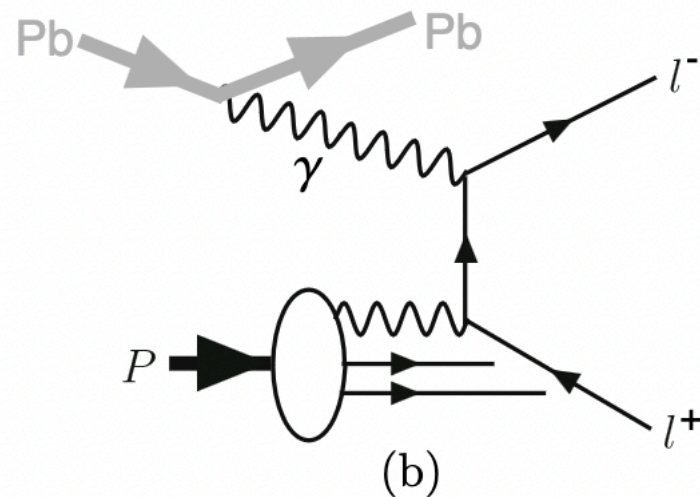
- What is the good reference to tune the single-dissociation to?
- Simple answer: more experimental measurements are needed
- Practical experience from comparing to data
 - $n_{ch} = 0$ - LPAIR is a good reference, models well lepton kinematics
 - $n_{ch} > 0$ - data missing to constrain modelling of charged particle spectrum/
underlying event
-

New measurements

- Survival factor kinematic dependence - have plenty of data to measure distributions at $n_{\text{trk}}=0$
 - Subtract only Drell-Yan background and let the theorists fit the mix of EL+SD+DD
- Large opportunities to use low- μ pp data
 - ATLAS: 250/pb (5.02 TeV) 340/pb (13 TeV) at $\mu=2$, expect 360/pb (13.6 TeV) at $\mu=4$, CMS less, but similar datasets
- Proton tagged events - unambiguously select the intact protons
 - feasibility how to design the measurements would be useful (diffractive backgrounds)

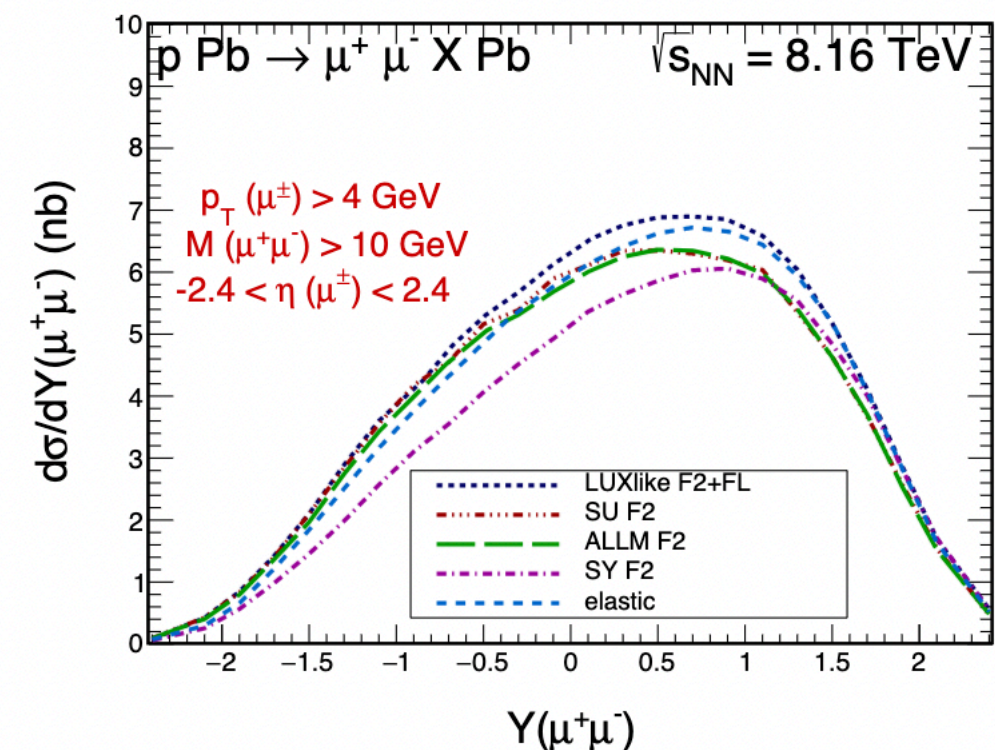
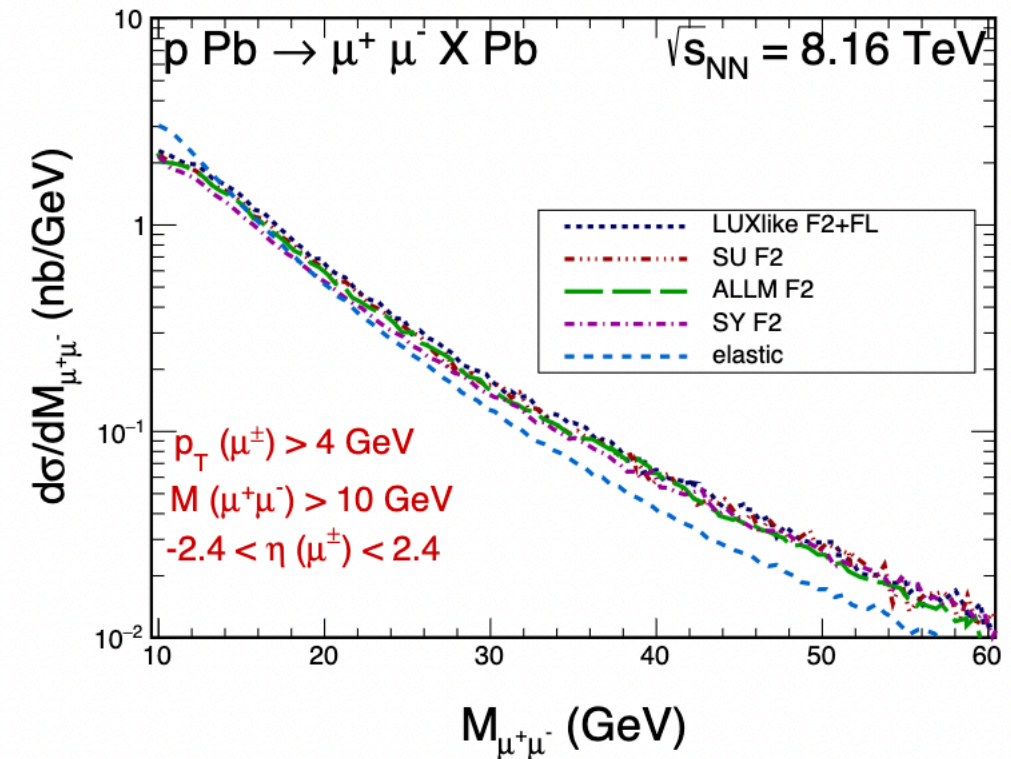
Probing single dissociative in pPb

[Dyndal et al. arXiv:1901.06305](#)



Variable	Requirement
lepton transverse momentum, p_T^ℓ	$> 4 \text{ GeV}$
lepton pseudorapidity, $ \eta^\ell $	< 2.4
dilepton invariant mass, $m_{\ell^+\ell^-}$	$> 10 \text{ GeV}$

- ZDC and rapidity gaps veto to suppress Drell-Yan or diffractive production



Non-photon induced background modelling

- One order of variation at low charged-particle multiplicity
- Experimentalists constrain the nch spectra to data using $qq \rightarrow Z$
- Transfer from Z to WW in bins of $pT(Z) \rightarrow pT(WW)$
- Analyses would simplify if modelling could be improved
- Background less of an issue when veto of the central activity more stringent (e.g. veto tracks down to 200 MeV instead of 500 MeV)

