Discussion session

REF 2018 — Tuesday & Thursday

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- Terminology: can we fix some common language?
  - TMD pdf vs. unintegrated parton distributions vs. low x TMD
  - operator definition of unintegrated parton distributions? Can we fix the relation? What is needed for that?
- How can we relate phenomenological motivated approaches (parton branching, KMR, “unintegrated DGLAP pdf”) to formal definitions of distributions (collinear, soft-collinear TMDs, low x TMDs, …)
- Can both approaches benefit from each other? Can “theory” deliver something for “pheno” and vice versa?
- Are low x/“unintegrated” distributions sufficiently well defined or is a (low x) theory effort needed? Hybrid formalism?
- TMDs for all x? Combined low and large x TMDs? Can we get numbers?

Results & Thoughts (so far)

- everything that depends on transverse momentum shall be called Transverse Momentum Dependent (TMD) distribution → use specific name, if you want to be specific (soft-collinear, low x, parton branching, …)

- factorization is needed to have framework which allows for systematic improvement; factorization breaking effects are small: quantify this smallness, when can they be ignored?

- as this is a phenomenology driven field there are 2 different approaches
  - theory driven: establish factorization, operator definition, RG evolution, …. if well defined: do fit of well defined observables; going beyond factorizing limit (pt/Q << 1, Q/s << 1) might be hard (resummation of resummation)
  - exploratory: construct model TMD pdf and compare to data; do phenomenology -> maybe needed to point out model character to avoid confusion of people outside of community (?)

- TMDs are needed to understand/control physics of confinement, angular momentum, spin,…. of hadrons → explore strong interacting dynamics.

- TMDs can be useful to make description of LHC events more efficient, “work with correct kinematics from leading order on” ….