A List with a Few Recollections and Thoughts

An Invitation to Discussion

Parton Showers and Resummation Muenster, June 10-12 2014 G. Sterman



Why are we doing any of this? To relate measurements to quantum mechanical histories encoded in amplitudes.

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 \mathcal{L}_{nature} : discovery and predictions.

A thread of the meeting: grappling with interference.

Why is interference such a problem?

Because the essence of showers and factorization is ordering.

Extra $\frac{1}{n!}$ in *n*-particle phase space which eliminates interference to first approximation.

Quantum histories become classical at LL.

And (only when) going beyond LL requires handling interference

Sessions and Topics

• Fixed Order

• (mostly Sudakov) Resummation (for threshold logs and jet structure)

- Coulomb/Glauber and the MPIs
 - The world of matching for PSs
 - Color structure

From Fixed order to Resum to Parton showers

Increasing "resolution" of predictions

Redistributions of probabilities

Somewhat different approximations and figures of merit are to be expected

But their interplay was in evidence throughout

Fixed Order

Kiril Melnikov – Joao Pires – Bernard Mistelburger – Marco Bonvini

The extraordinary challenges of NNLO, N3LO (!) projections and master integrals

The uses and limitations of threshold resummation as a guide (e.g. threshold resummation at large rapidity)

The singularities to be organized and cancelled in FO calculations reflect underlying classical trajectories.

The number of such classical histories increases rapidly with the number of loops and external lines.

Resummed Cross Sections and their limitations

Marco Bonvini – Eric Laenen – Andreas Papaestathiou – Mrinal Dasgupta

Logs you can see (Q_T) . Logs you infer (Higgs σ_{tot})

Eikonal, next-to-eikonal, imaginary parts (viz. Coulomb Xchange)

A "Sudakov" approach to the energy emission (viz. Coulomb/Glauber Xchange)

Jet horticultural analysis (the power of PT)

Glauber – Coulomb Gluons and MPI

The impact of asking questions about the final state!

Approach to exclusivity – the loss of real/virtual cancellation for gluons of moderate \rightarrow "super leading" from IS/FS.

Viz. Eikonal imaginary parts.

The role of FS MPIs (E_T , "beam thrust")

Include rapidity of spectators into analysis? Scales of the pinches.

Matching in PSs

Marek Schoenherr – Zoltan Nagy – Simon Platzer – Malin Sjodahl – Lief Lonnblad – Stefan Prestel – Andrez Siodmok – Deepak Kar

A rapidly-developing technology: NLO with NNLO contemplated.

Grappling with non-classical development (a forest of acronyms "UNLOPS")

And one new whole word: "Deductor": color history interference, toward spin.

Matching: " Δ " suppression before the observed emissions; showering after very much the spirit of resummation.

For a fixed number of colored patrons, showing becomes coherent.

A role for the soft anomalous dimension matrices of threshold resummation and important progress

Is there a role for PT in the description of color coherence probed by (say) jet vetoes?

Is there a role for low-x? The MC scheme?

Everything today

Tomas Jezo – Samantha Dooling – Felix Ringer

How best to apply PSs and threshold resummation to semi-inclusive cross sections?

What's the origin of those upturns in 2j?

Simone Alioli – Christian Bauer

Geneva

Getting the best from resummation and showering.

New: DY

And a framework for LO to NLO to NNLO with showers

AND – MANY THANKS TO OUR HOSTS!