Silvia → name

Ferrario Ravasio → surname,

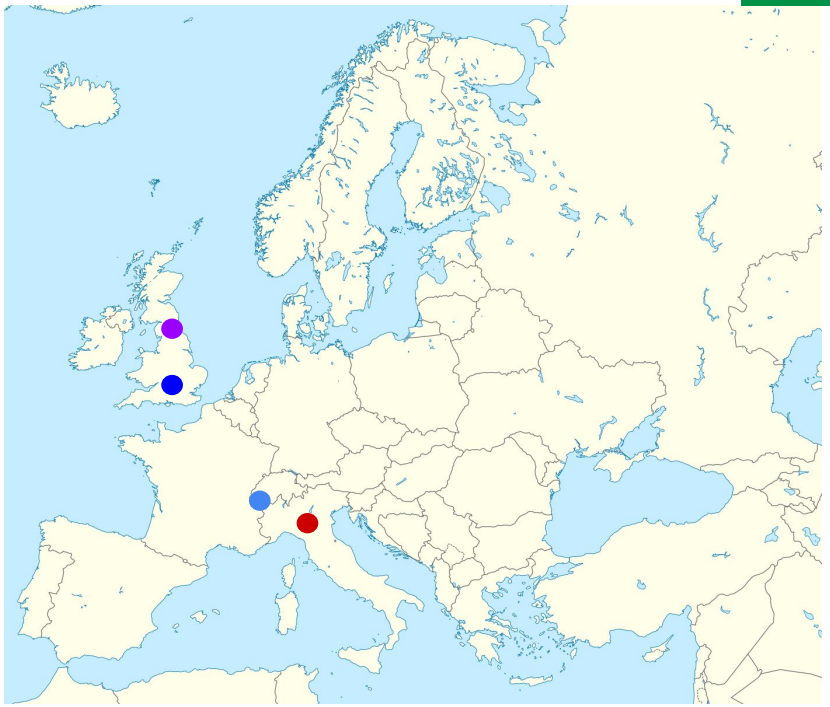
no hyphen,

no Ravasio

CERN TH retreat

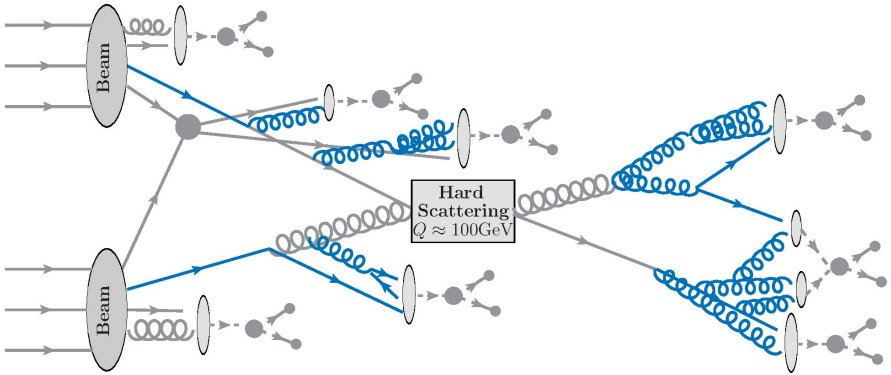
7-9 November 2022

My academic path

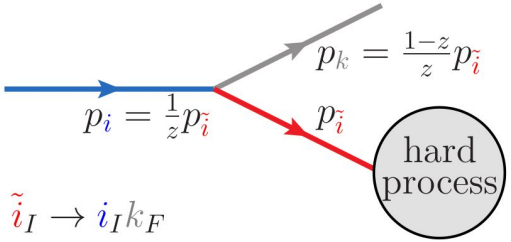


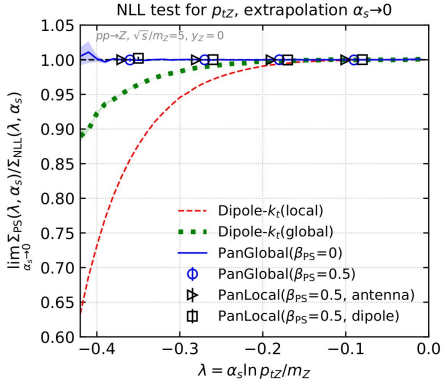
- 2010-2018: Bachelor, master and PhD @ **University of Milano-Bicocca (IT)**
  master & PhD advisor: Carlo Oleari
  master & PhD co-advisor: Paolo Nason
- 2018-2020: 1st Postdoc @ IPPP (Durham U.), in the group of Peter Richardson
- 2020-2022: 2nd Postdoc @ University of Oxford, in the group of Gavin Salam
- 2022-????: 3rd Postdoc @ CERN, QCD group

My favourite research topic: parton showers

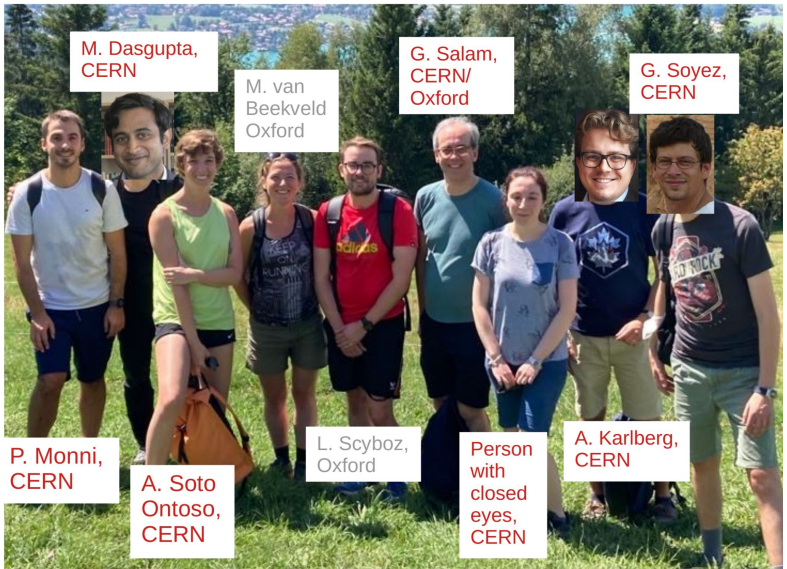


Within the **PanScales** collaboration, I am working at the development of more accurate **parton showers** (PS) for hadron colliders, aka the core component of General Purpose MC Event Generators, which establish the connection between theory and experiments.



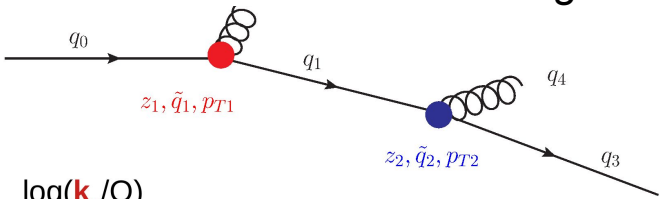


PanScales showers for **colour-singlet production in hadron collisions**: van Beekveld, SFR, Hamilton, Salam, Soto-Ontoso, Soyez, Verheyen

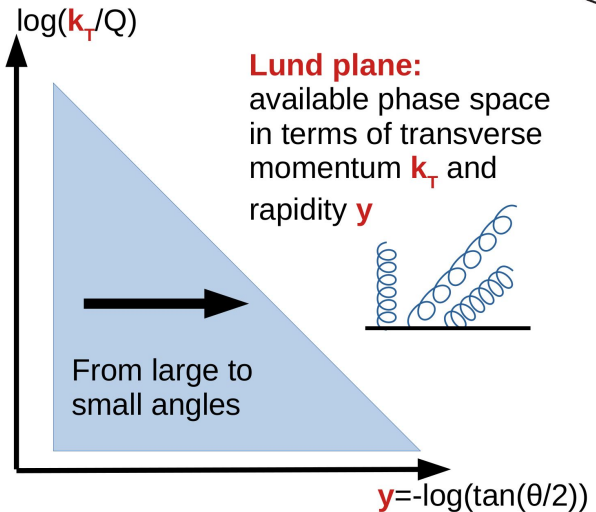


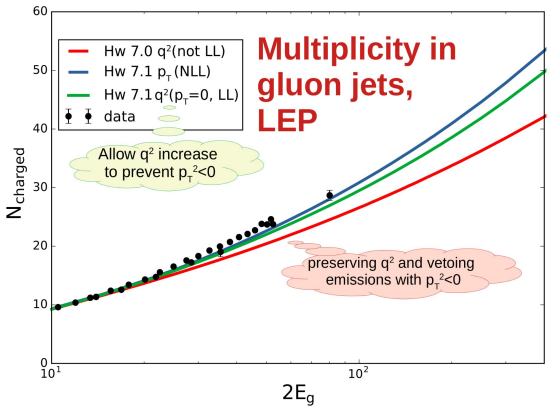
The first shower is never forgotten: Herwig7

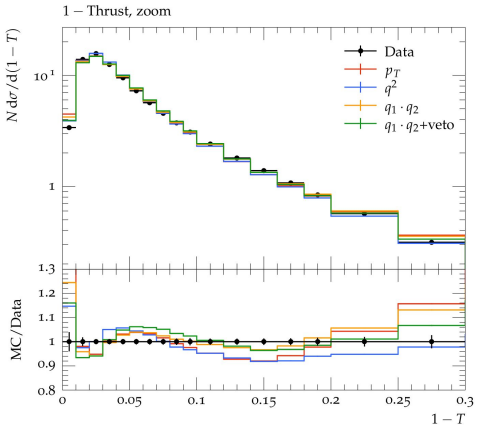
Member of the Herwig7 collaboration, (and I can help installing and running the most updated version on lxplus).
With G. Bewick, P. Richardson, and M. Seymour we changed the interpretation of the ordering variable to improve formal accuracy/ agreement with data of the angular-ordered shower.



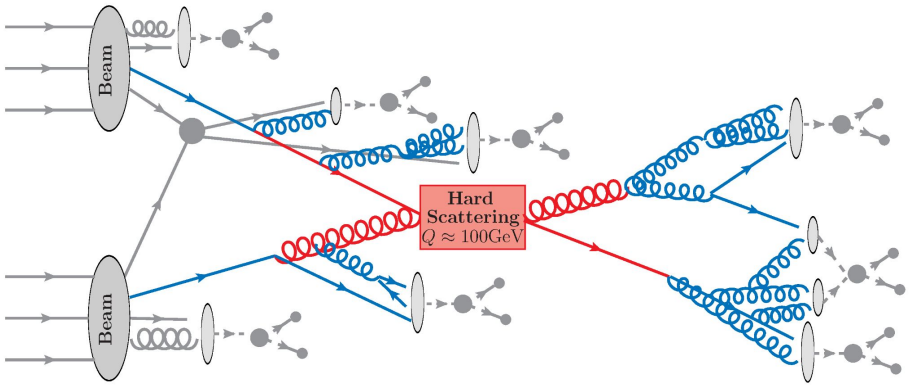
$$\tilde{q}^2_{0\to 1,2} = \frac{k^2_{\perp,1}}{z_1^2 z_2^2} = \frac{q_0^2}{z_1 z_2} = \frac{2q_1\cdot q_2}{z_1 z_2}$$





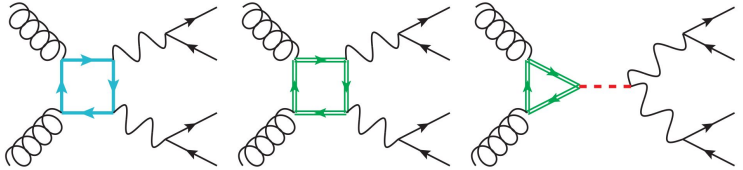


Favourite Monte Carlo: the POWHEG BOX

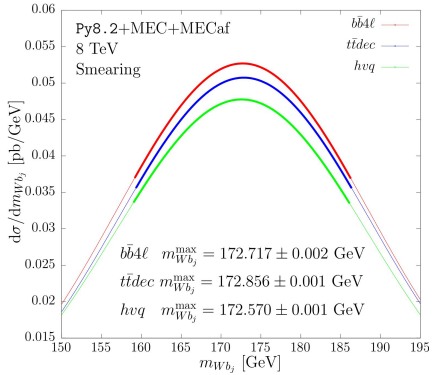


State-of-the-art Monte Carlo simulations for the LHC rely on **Next-to-Leading Order plus Parton Showers** (sometimes NNLO)

The **POWHEG BOX** (core authors: Nason, Alioli, Jezo, Oleari, Re) enables to combine NLO calculations with PS, avoiding double counting



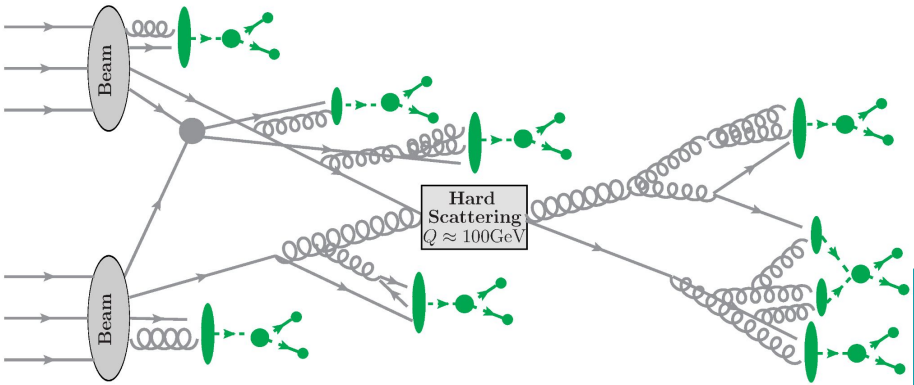
I've used/tested/debugged POWHEG BOX for > 8 years.
Recently promoted to be one of the core **developers/maintainers**, typically responsible of helping ppl to **shower it with HW7/PY8**.
Can help to install and run on LXPLUS.



4 lepton production in gg fusion, with Alioli, Lindert, Röntsch

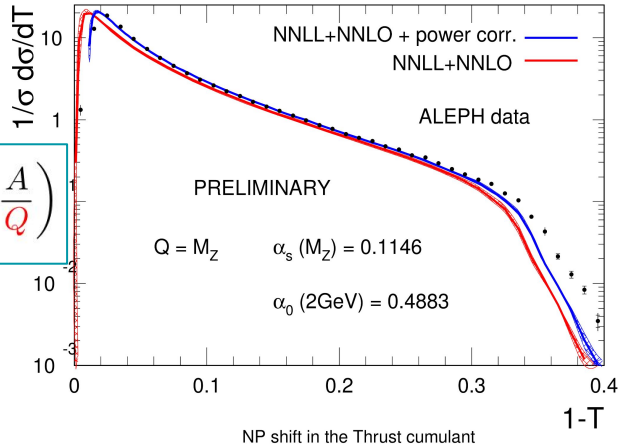
Study of NLO (POWHEG) + PS generators for top-pair production, with increasing accuracy in the top decay, with Jezo, Nason, Oleari

Too much (NLO)PS is boring: non-perturbative power corrections



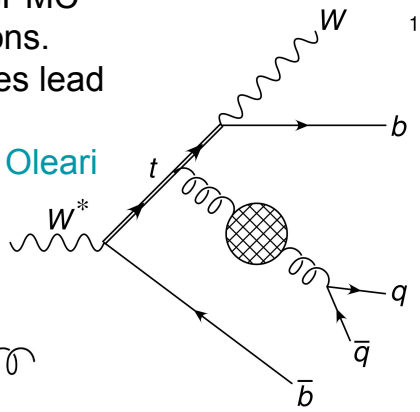
Hadronisation effects manifests as linear (or quadratic …) **power corrections**

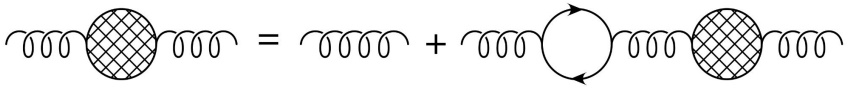
$$\Sigma(v) = \Sigma^{\text{pert}}\left(v + \frac{A}{Q}\right)$$

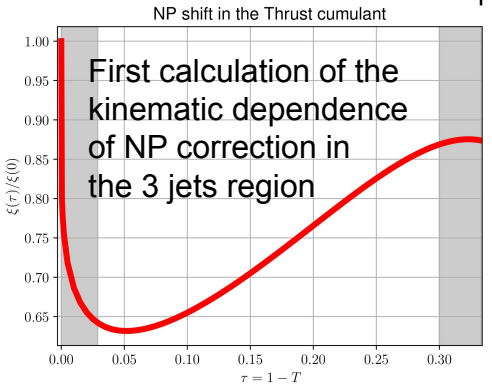


Most precise analytic calculations not embedded in GPMC and need an external input for hadronisation corrections. Current models assume *A(v)* constant for event shapes lead to α~0.113(1)!

With Caola, Limatola, Melnikov, Nason, Oezcelik and Oleari we formulated a semi-analytic method to assess the leading power corrections








Beyond QCD