Strong coupling from thrust at lepton colliders

https://indico.cern.ch/e/asthrust2025

November 27 – 28, 2025 - CERN

Organizers: Alexander Huss, Pier Francesco Monni, Gherardo Vita

General Philosophy and Goals

- Create a community effort to address key open questions in strong coupling determinations at lepton colliders

General Philosophy and Goals

- Create a community effort to address key open questions in strong coupling determinations at lepton colliders
- Reconcile

Very high precision data from lepton colliders

Availability of sophisticated theory tools

(N^4LL resummation, $O(as^3)$ fixed order, “analytic” treatment of hadronization effects, renormalon subtractions, hadron mass effects, 3jet power corrections, etc.)

Discrepancies between analyses

- Central value
- Uncertainties
- Systematics, known unknowns, and unknown unknowns

General Philosophy and Goals

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- What are the assumptions in a theory framework for a given fit setup?
- Can we agree on what assumptions are reasonable for a given fit setup?
- What tests can we perform/show to validate assumptions made?

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- Start simple
  - Fix observable: **thrust**
  - Focus on subset of aspects:
    - 2 jet vs 3 jet power corrections
    - Hadron mass effects
    - Data
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Many other interesting aspects we won't focus on at this round:

- Anomalous scaling of 3 jet power corrections
- Renormalon subtraction
- Scheme dependence of non-perturbative inputs
- Other event shapes
- Theory correlations
- ….

…but we have to start from somewhere

General Philosophy and Goals

Start this community effort today and address other aspects in future meetings

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Schedule

Thu, November 27

- **9:00 AM** → 9:30 AM **Coffee** — 4/2-011 - TH common room
- **10:00 AM** → 12:00 PM **Impact of 3-jet power corrections** — 4/S-030
  - 10:00 AM **Talk by Giulia Zanderighi/Paolo Nason** — 15m
  - 10:15 AM **Talk by Vicent Mateu** — 15m
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Fri, November 28

- **9:00 AM** → 9:30 AM **Coffee** — 4/2-011 - TH common room
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Short talks to set the ground on the topic

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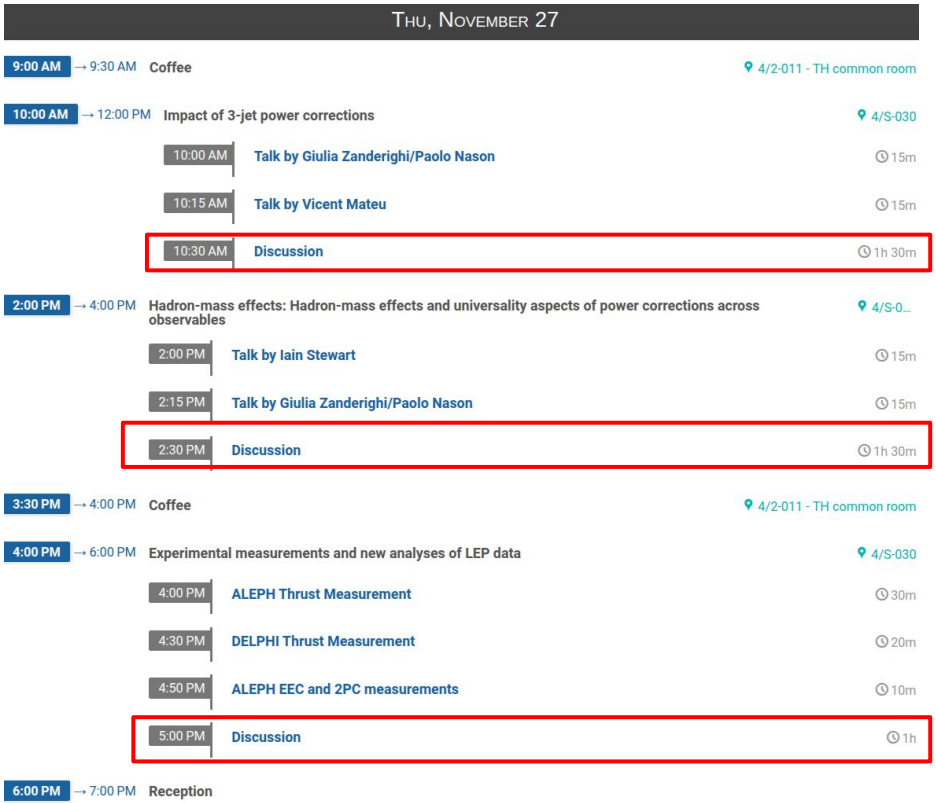

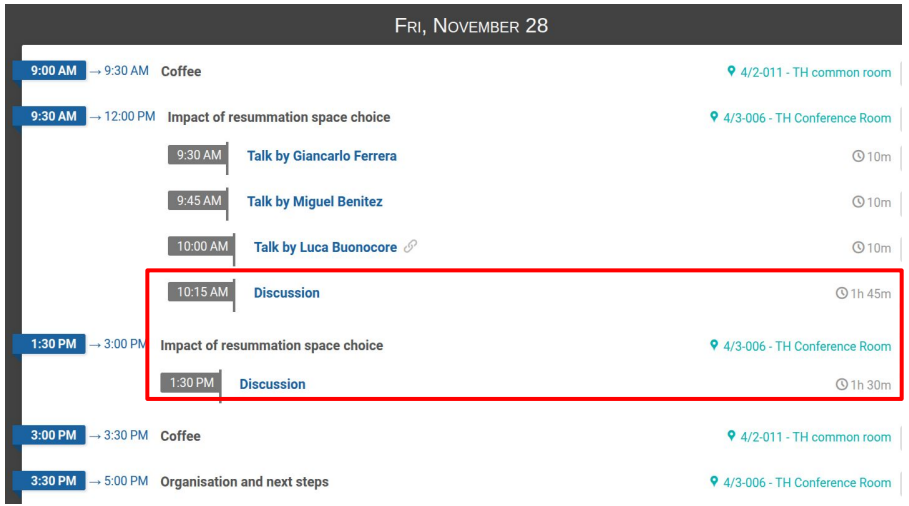

Plenty of time for discussion

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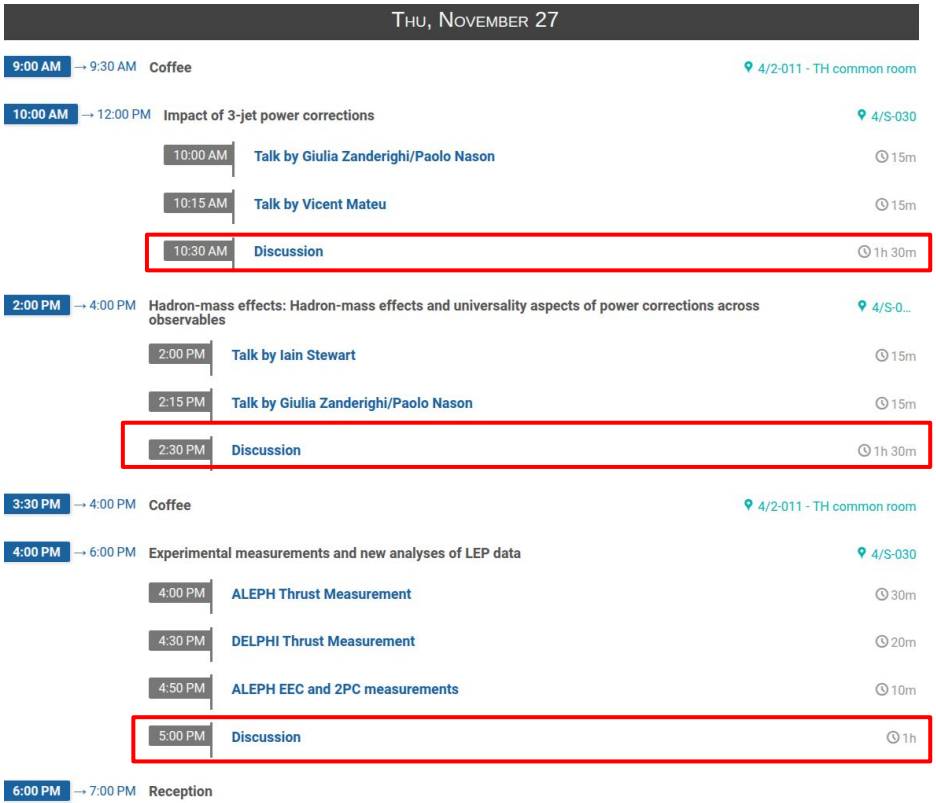

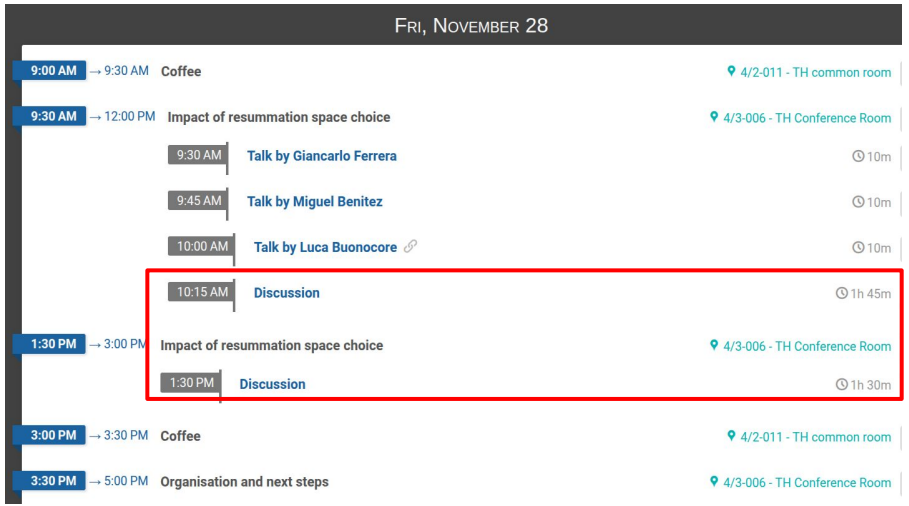

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We have blackboards, we can look at papers, we can setup benchmark exercise, …

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If there is disagreement on starting points/assumptions let's focus on discussing them before diving in into very detailed refinements

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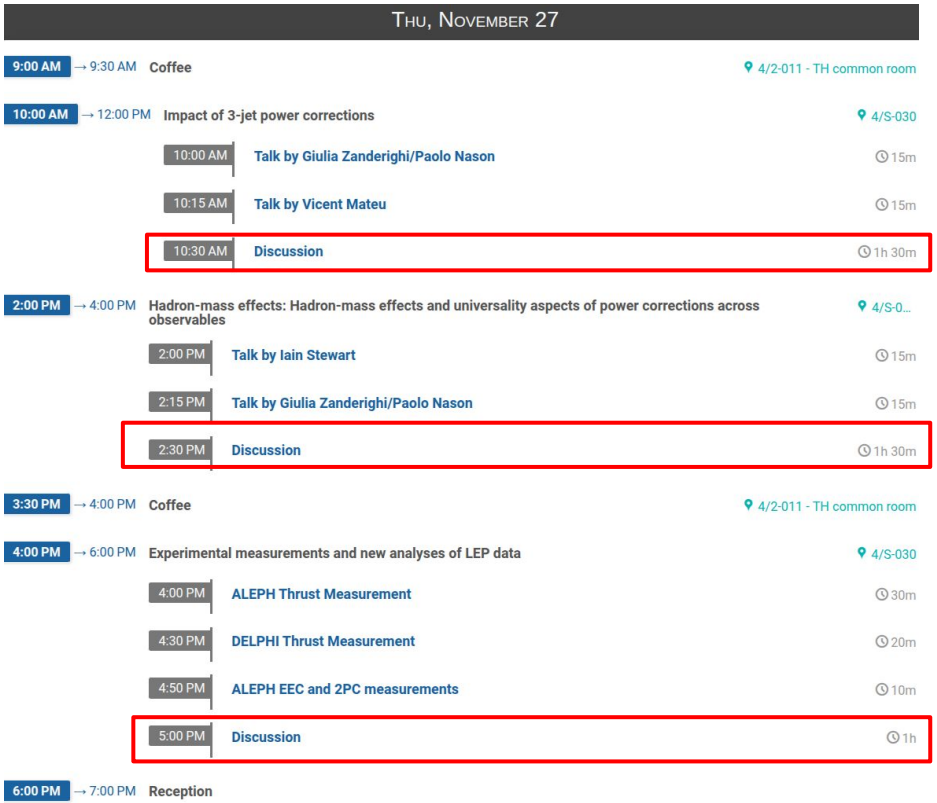

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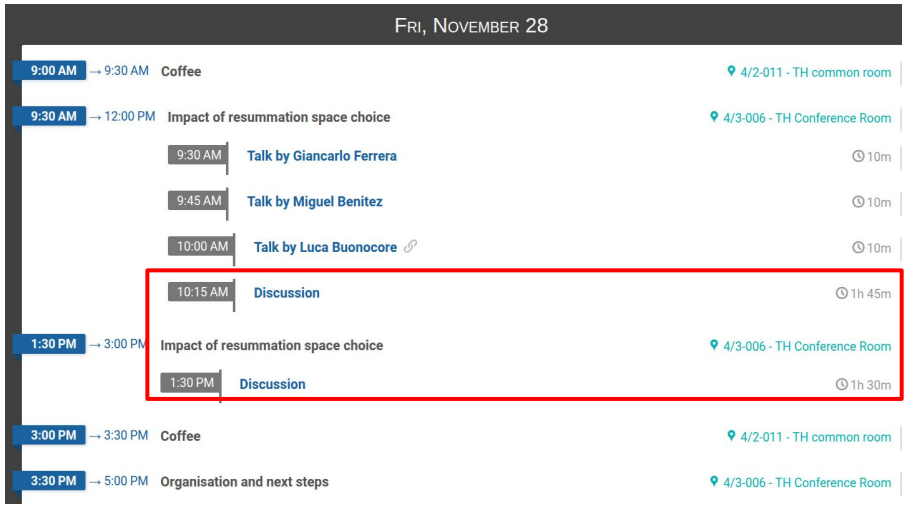

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Let's keep this in mind…

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Example: Small τ, di-jet, 3-jet, peak, tail, far-tail, perturbative dijet, …

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Experimental overview on recent LEP reanalysis

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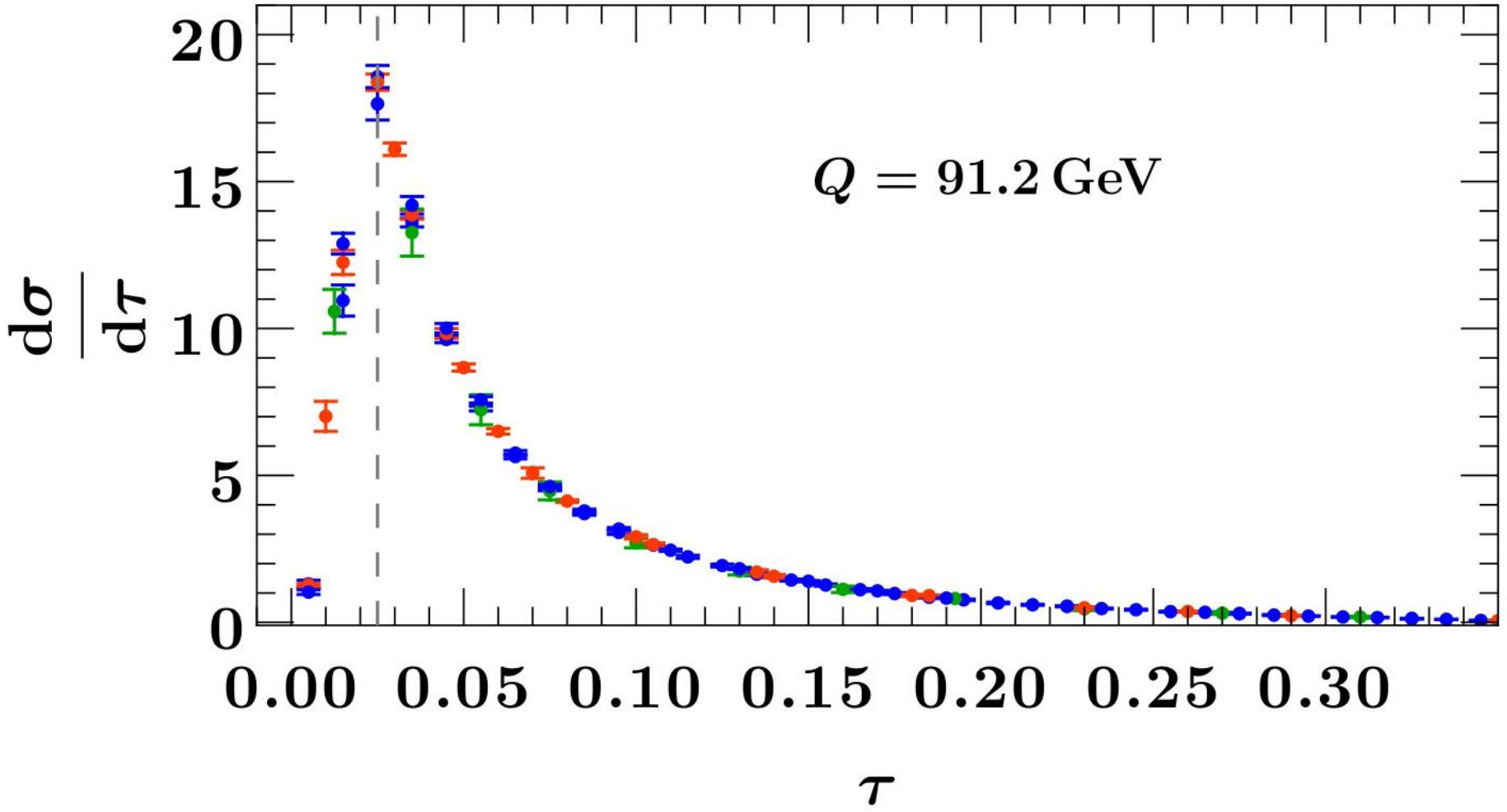
Reception today from 6pm


$Q = 91.2\,\mathrm{GeV}$
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