The physics of Pino

Giulia Zanderighi

Pino2012, Cortona

~~The~~ *My* physics ~~of~~ *with* Pino

(some of) what I learnt,
and where it lead my research to

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  - ✓ taking into account soft inter-jet gluon radiation
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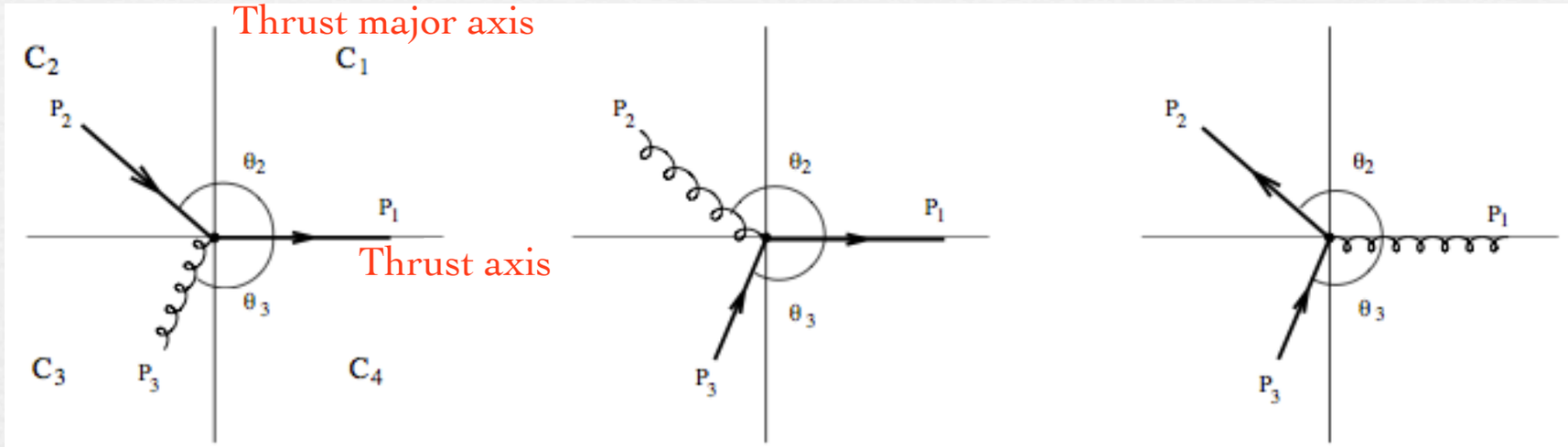
It was an ambitious program and it showed an excellent vision of where the attention would move to in the following years

K_{out}

The out-of-plane radiation (K_{out}) was the first multijet observable we studied



Understanding, parametrizing and solving the kinematics involved in the real radiation was one of the main tasks, e.g. if $P_{2/3}$ emit a soft gluon k then $K_{out}=2k_x$, but if P_1 (the hardest) emits a soft gluon then $K_{out}=4k_x$. These constraints needed to be implemented via theta/delta functions, which needed to be factorized taking Mellin/Fourier transforms.

In comparison virtual corrections were trivial, just a "-1" from unitarity

K_{out}

The answer was expressed as

$$\Sigma(K_{\text{out}}) \sim e^{-R(\bar{K}_{\text{out}})}\mathcal{F}(K_{\text{out}})$$

where

- $e^{-R(\bar{K}_{\text{out}})}$ is a naive single gluon exponentiation from a three parton system
- $\mathcal{F}(K_{\text{out}})$ encodes recoil and multiple emission effects and was expressed as a five dimensional integral

This year Andrea, Gavin and myself published the NLL resummation for the jet-veto in Higgs/DY, which has a similar form, only with

$$\mathcal{F}(p_{\text{t,veto}}) = 1$$

In many other ways, my research in the last 10 years has been a continuation of the work started with Pino

Pino's influence on my research

- In 2001 Andrea, Gavin and myself developed a semi-numerical method to compute the $\mathcal{F}$- function (some of these results are still very hard to obtain in SCET)

- In 2003-4 we wrote the code CAESAR that further develops these ideas and automates NLL resummations. It includes resummations for event shapes with hadrons in the initial state, but all issues with hadrons in the initial state were dealt with in a work with Pino on the resummation for Drell-Yan + jet and DIS dijet production

- Later, I worked on multi-jet events at pure NLO level, and currently I'm working with Hamilton/Nason on how to implement Sudakov effects systematically in multi-jet NLO calculations

A workday with Pino

The work started in front of an empty blackboard ...

... we would then fill the blackboard with equations ...

.... but then the day ended with an empty blackboard

I never saw Pino copying down anything. It's like equations were the natural way of formulating his thoughts.

I learned that it's only when you can write down your equations without help that you fully master the problem

Another lesson

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So, one more the thing that I learnt from Pino it that it's never so much about what you do each day, but what you learn day by day

Thank you Pino!

And thank you to the organizer for the opportunity to be here

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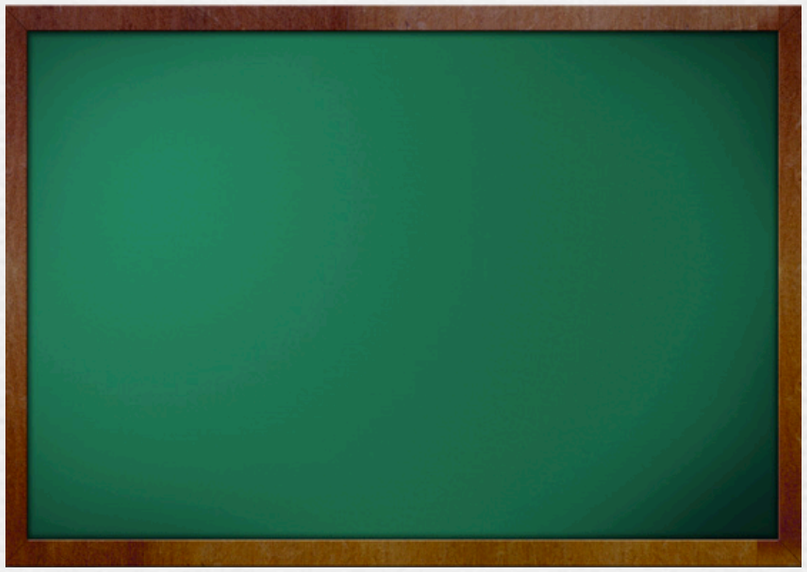

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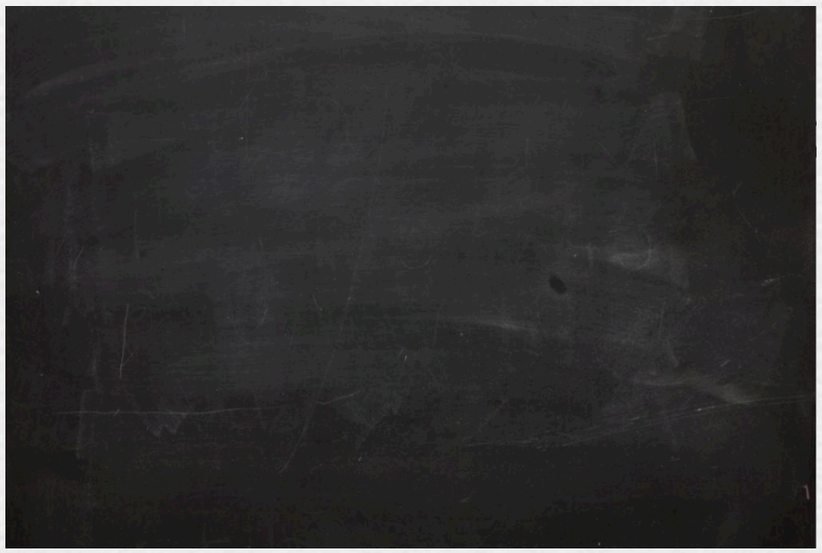

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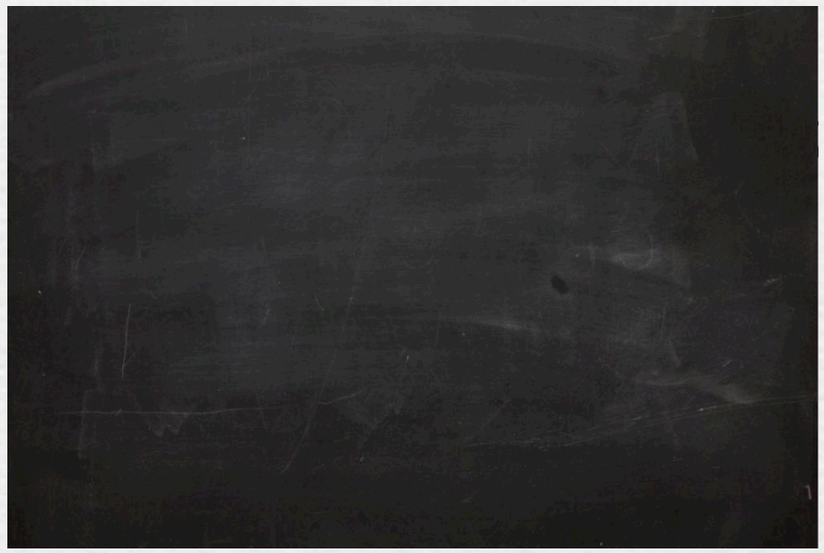

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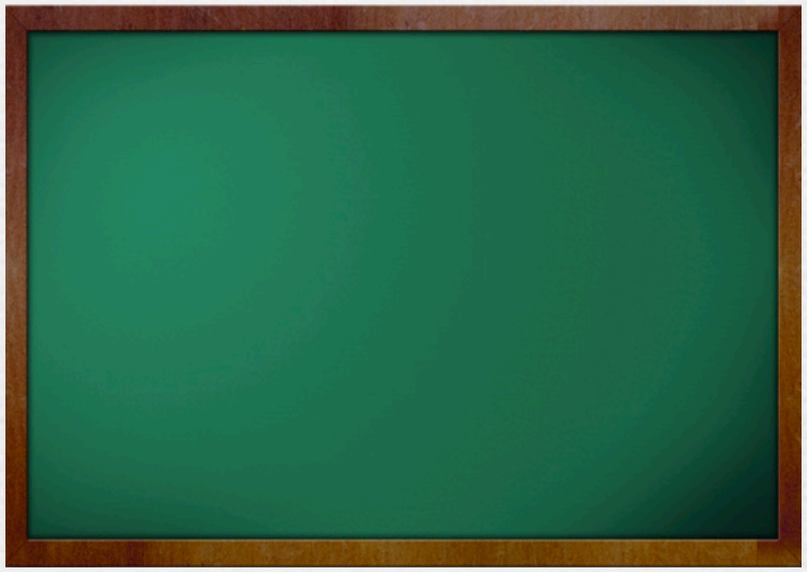

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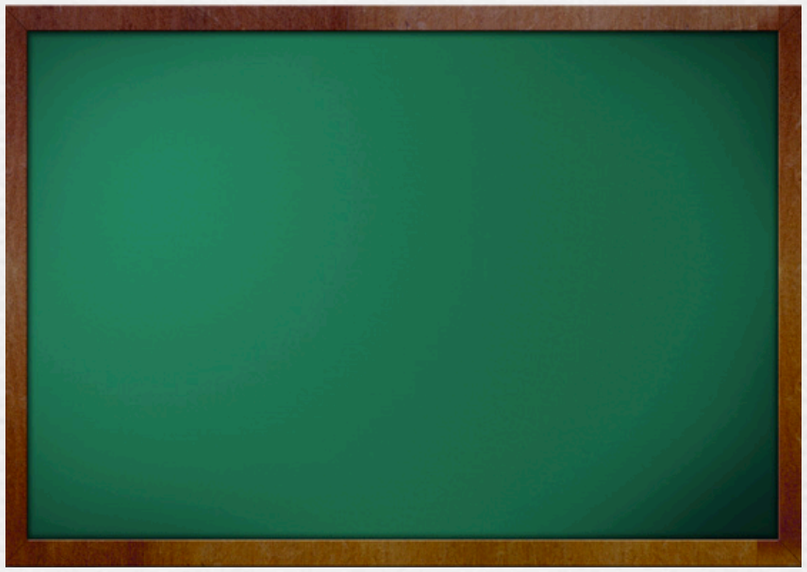

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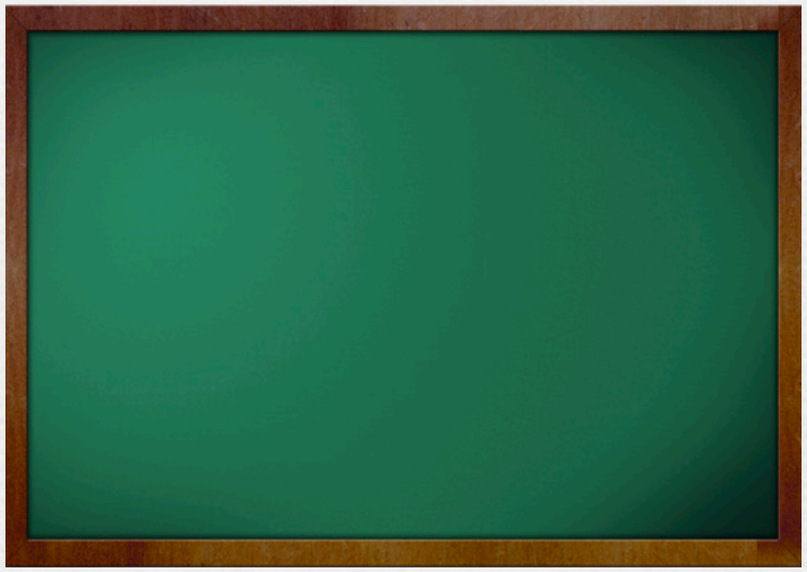

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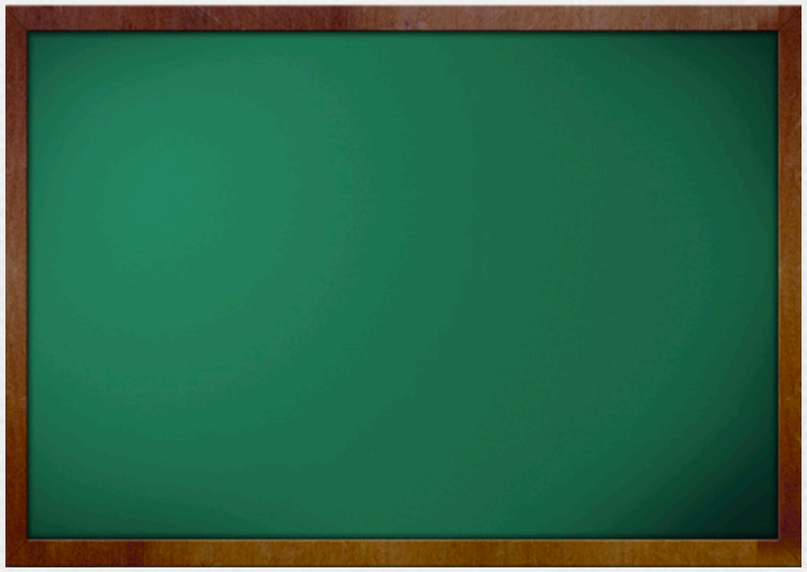

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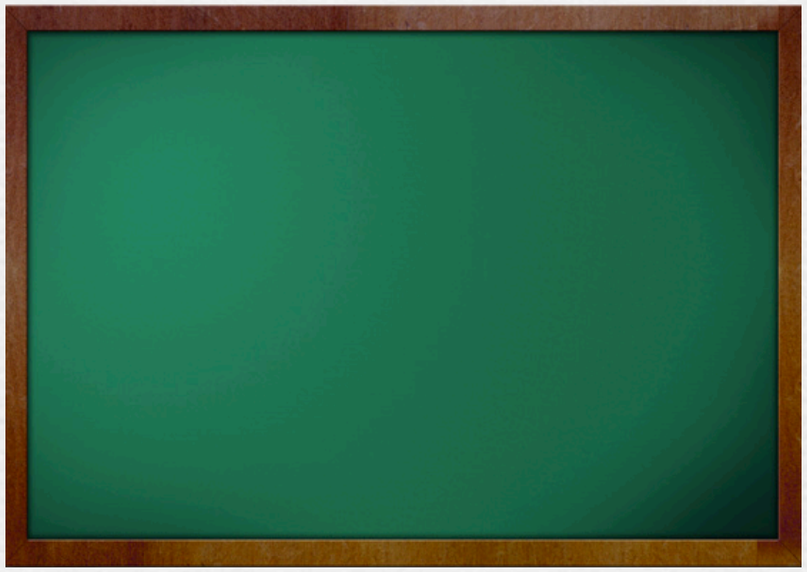

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