



LHCphenonet



*LHC PhenoNet Mid-Term Meeting
16-20 September, Ravello (Italy)*

Domenico Bonocore (ESR)

Nikhef, Amsterdam, Netherlands



Short CV:

- *Born in Genoa (Italy)*
- *Mar 2010- BS in Physics - University of Genoa*
- *Nov 2011- MS in Theoretical Physics - University of Genoa (project on Lattice QCD "Gauge theories in the large N limit")*
- *Dec 2011 - started PhD (4 years) as ESR (3 years) at Nikhef Theory Group and at UvA (Amsterdam) under supervisor of prof. E. Laenen*

*PhD position tightly related to the
LHC PhenoNet - Marie Curie Grants*

Research project

Research project :

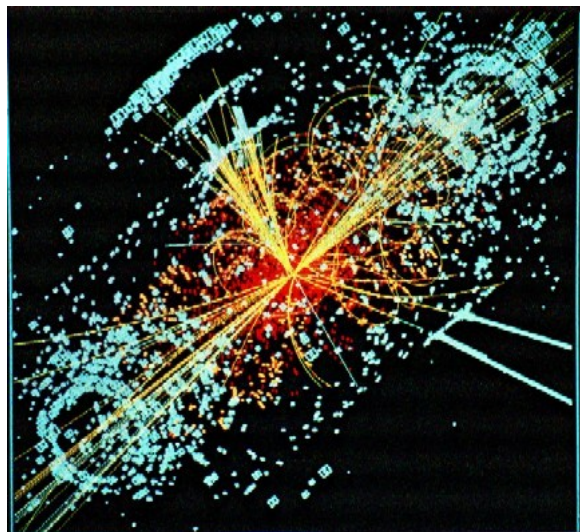
WP1: Precision - Resummation

WP3: Support to Experiments - Top Quark

Both strictly related to the LHC Phenomenology



Research project WP1 - Resummation: topic



Development of new resummation techniques for soft divergences by using a first quantized path integral approach with next-to-eikonal accuracy.

- Laenen, Stavenga, White – Path integral approach to eikonal and next-to-eikonal exponentiation [ArXiv 0811.2067]
- Lanen, Magnea, Stavenga, White - Next-to-eikonal corrections to soft gluon radiation: a diagrammatic approach [ArXiv 1010.1860].

Research project WP1 - Resummation: people

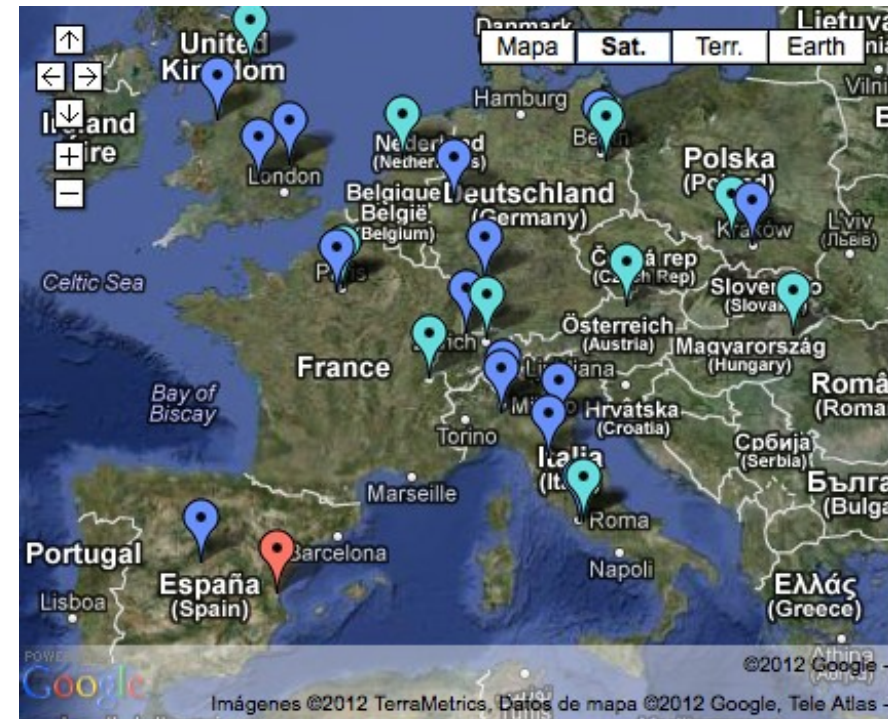
In collaboration with:

E. Laenen (Nikhef, University of Amsterdam UvA, and Utrecht University, Netherlands)



C. White (School of Physics and Astronomy, University of Glasgow, UK)

L. Magnea (INFN and Dipartimento di Fisica Teorica, Università' di Torino, Italy)

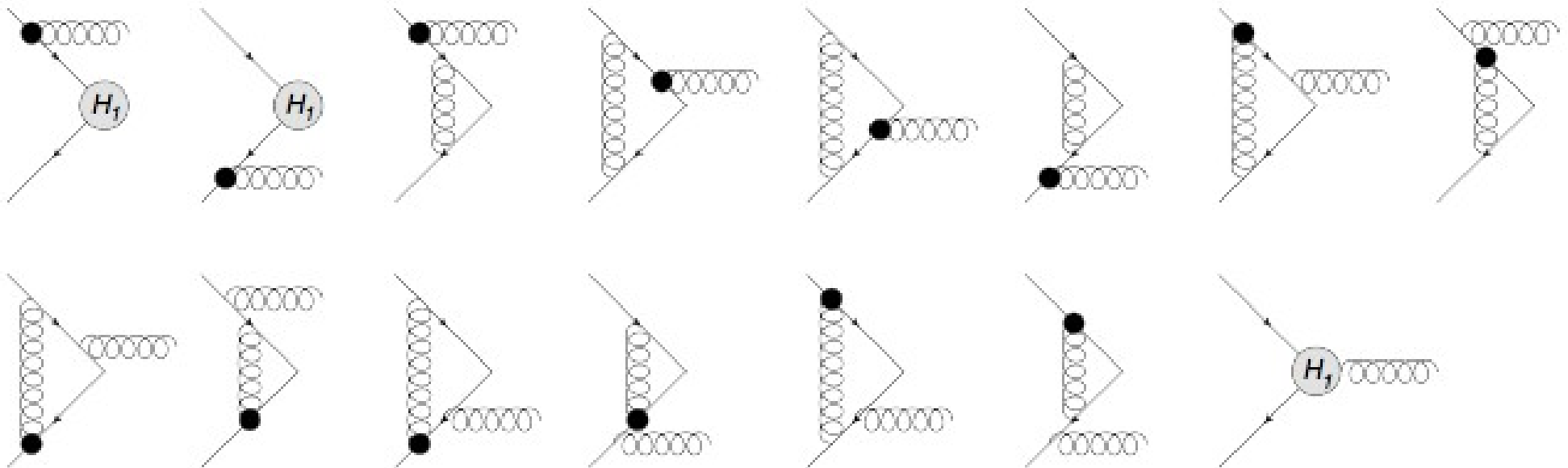


Research project WP1 - Resummation: state of the art

Implementing our new effective theory in the case of the Drell Yan process. It is a test!

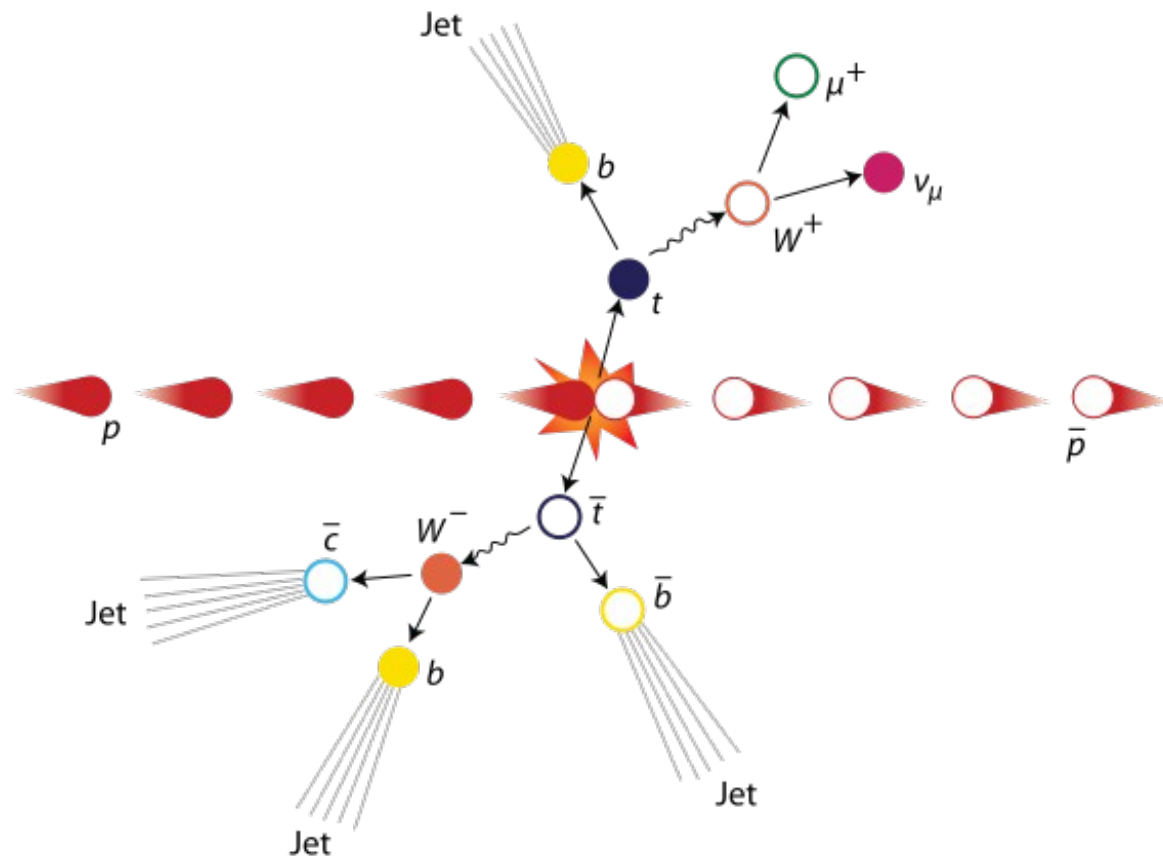
Preliminary results:

$$\mathcal{M}_{DY} = \int \mathcal{D}A_\mu e^{iS[A_\mu]} \left[1 + \int \frac{d^d k}{(2\pi)^d} \tilde{A}_\mu(k) \left(\frac{p^\mu}{p \cdot k} k_\nu \frac{\partial}{\partial p_\nu} - \frac{\partial}{\partial p_\mu} + \frac{\bar{p}^\mu}{\bar{p} \cdot k} k_\lambda \frac{\partial}{\partial \bar{p}_\lambda} - \frac{\partial}{\partial \bar{p}_\mu} \right) \right] \\ \times H(p, \bar{p}, A) f(p, A) f(\bar{p}, A) + \mathcal{O}(NNE)$$



Research project WP3 - Heavy Quark Physics (future)

Monte Carlo event generators and simulations for top quark pair production plus jets and parton showers at NLO (MC@NLO).



- Frixione, Laenen, Maltoni, White - Isolating Wt production at the LHC [ArXiv 0908.0631]
- Frixione, Herquet, Klasen, Laenen, Plehn, Weydert, Stavenga, White - Charged Higgs boson production in association with a top quark in MC@NLO [arXiv:0912.3430]



Training as part of the Network

Schools and conferences

- *LHC Phenonet Winter School - Ascona (CH)*
- *LHC PhenoNet Annual Meeting - Durham (UK)
(Talk "Next to Eikonal Webs")*
- *LHC PhenoNet Mid-Term Meeting - Ravello (IT)*

and others upcoming..

ORGANIZATION

MARIE CURIE

Training as part of the Dutch System

- *Annual DRSTP School for Theoretical Physics*

(2 weeks in Winter)

(<http://web.science.uu.nl/DRSTP/>)

- *Nikhef Topical and Academic Lectures*

Glen Cowan, Statistical Methods for Particle Physics

(http://www.pp.rhul.ac.uk/~cowan/stat_nikhef.html)

Piet Mulders, Lectures on Majorana's neutrinos

(<http://www.nat.vu.nl/~mulders/QFT2012-Majorana.pdf>)

- *Monthly National Theory Meeting (among theory institutes in the NL)*

- *Monthly Journal Club*

(<http://www.nikhef.nl/pub/theory/journalclub.html>)

- *Various seminars (Nikhef, UvA, TH Cosmology)*

Additional non-physics training organized by FOM

- *"Take Charge of your PhD" Course*

- *Dutch Welcome Course*

Secondment to industrial partners



*Internship (Sep-Dec 2012)
at Wolfram Research, Inc.
Urbana-Champaign (IL, US)*

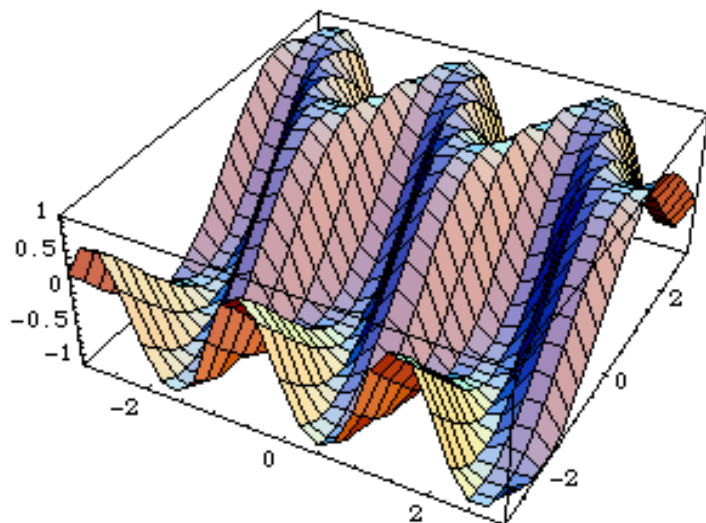
Wolfram
Mathematica®



```
In[4]:= Integrate[1/{x^3-1}, x]
```

```
Out[4]=  $\left\{ -\frac{\text{ArcTan}\left[\frac{1+2x}{\sqrt{3}}\right]}{\sqrt{3}} + \frac{1}{3} \text{Log}[-1+x] - \frac{1}{6} \text{Log}[1+x+x^2] \right\}$ 
```

```
In[5]:= Plot3D[Sin[y+Sin[3 x]], {x, -3, 3}, {y, -3, 3}]
```



```
Out[5]= - SurfaceGraphics -
```

*Project:
implementations of
packages for special
special functions
(supervision of
Oleksandr Pavlyk)*

Thank you for your attention!