LF21: PHENOMENOLOGY OF ELEMENTARY PARTICLE INTERACTIONS AT COLLIDERS

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1 Summary of the project

The research topics investigated within this project can be divided into two main areas:

- Flavour physics, precision tests and physics beyond the Standard Model (G. Isidori, J. Jones Perez);
- Theoretical and phenomenological aspects of QCD and collider phyiscs (G. Corcella, V. Del Duca, G. Pancheri).

Some of the most significant projects completed in 2012 in these two research areas are listed below.

I. *Flavour physics, precision tests, and physics beyond the Standard Model*

Precise theoretical prediction of BR($B_s \to \mu^+\mu^-$) within the Standard Model and analysis of the implication of the LHCb measurement of CP violation in the charm system. [1, 2, 3]

Analysis of the implications of the discovery of a Higgs boson, with mass around 125 GeV, both in the Standard Model and beyond. [4, 5]

Analysis of the latest LHC data in constraining the structure of the minimal supersymmetric extension of the Standard Model. [6]

Analysis of the possible signatures of new heavy neutral gauge bosons at the LHC in an extended supersymmetric extension of the Standard Model. [9]

II. *Theoretical and phenomenological aspects of QCD and collider phyiscs*

Further progress in the derivation of a general formula to describe the infrared structure of generic scattering amplitudes, within gauge theories, in the high-energy limit. [10]

Refined theoretical predictions for the total and the inelastic cross-sections at the LHC. [12]

2 Main contributions to Conference Proccedings published in 2012

1. L. Magnea, V. Del Duca, C. Duhr, E. Gardi and C. D. White, PoS LL **2012** (2012) 008 [arXiv:1210.6786 [hep-ph]].
2. R. M. Godbole, K. Mohan and G. Pancheri, Frascati Phys. Ser. **54** (2012) 70.
3. G. Pancheri, R. M. Godbole, A. Grau, O. Shekhovtsova and Y. N. Srivastava, Frascati Phys. Ser. **54** (2012) 120.
4. G. Pancheri and Y. Srivastava, Nuovo Cim. C **035N1** (2012) 15.

3 Full list of publications of the year 2012

References

1. A. J. Buras, J. Girrbach, D. Guadagnoli and G. Isidori, Eur. Phys. J. C **72** (2012) 2172 [arXiv:1208.0934 [hep-ph]].
2. G. Isidori and J. F. Kamenik, Phys. Rev. Lett. **109** (2012) 171801 [arXiv:1205.3164 [hep-ph]].
3. G. F. Giudice, G. Isidori and P. Paradisi, JHEP **1204** (2012) 060 [arXiv:1201.6204 [hep-ph]].
4. G. Degrassi, S. Di Vita, J. Elias-Miro, J. R. Espinosa, G. F. Giudice, G. Isidori and A. Strumia, JHEP **1208** (2012) 098 [arXiv:1205.6497 [hep-ph]].
5. G. Blankenburg, J. Ellis and G. Isidori, Phys. Lett. B **712** (2012) 386 [arXiv:1202.5704 [hep-ph]].
6. O. Buchmueller *et al.*, Eur. Phys. J. C **72** (2012) 2243 [arXiv:1207.7315 [hep-ph]].
7. G. Blankenburg, G. Isidori and J. Jones-Perez, Eur. Phys. J. C **72** (2012) 2126 [arXiv:1204.0688 [hep-ph]].
8. G. Isidori and D. M. Straub, Eur. Phys. J. C **72** (2012) 2103 [arXiv:1202.0464 [hep-ph]].
9. G. Corcella and S. Gentile, Nucl. Phys. B **866** (2013) 293 [Erratum-ibid. **2013** (2013) 554] [arXiv:1205.5780 [hep-ph]].
10. V. Del Duca, C. Duhr, E. Gardi, L. Magnea and C. D. White, arXiv:1201.2841 [hep-ph]; Phys. Rev. D **85** (2012) 071104.
11. S. Biondini, O. Panella, G. Pancheri, Y. N. Srivastava and L. Fano, Phys. Rev. D **85** (2012) 095018 [arXiv:1201.3764 [hep-ph]].
12. A. Grau, S. Pacetti, G. Pancheri and Y. N. Srivastava, Phys. Lett. B **714** (2012) 70 [arXiv:1206.1076 [hep-ph]].
13. A. Delgado, G. F. Giudice, G. Isidori, M. Pierini and A. Strumia, arXiv:1212.6847 [hep-ph], to appear in Eur. Phys. J. C
14. O. Gedalia, G. Isidori, F. Maltoni, G. Perez, M. Selvaggi and Y. Soreq, arXiv:1212.4611 [hep-ph], submitted to Phys. Rev. Lett.
15. S. Biondini, O. Panella, G. Pancheri, Y. N. Srivstava and L. Fano, arXiv:1201.3764 [hep-ph].