Accurate computations in field theory

J. Ph. Guillet

LAPTH
CNRS/Université de Savoie

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Collaboration between LAPTH and LPSC

Permanent staff : F. Boudjema, J.-Ph. Guillet, B. Herrmann, E. Pilon, I. Schienbein
Post-docs : T. Stavreva
Doctoral students : F. Lyonnet, J. Proudom, S. Zidi

The discovery of the Higgs boson and/or New Physics will only be possible if one has good control on the predictions of the rates for the Standard Model processes $\rightarrow$ calculations beyond the usual tree-level estimates.

Furthermore, the search for many of these new particles at hadronic colliders often relies on signatures based on cascade decays $\rightarrow$ NLO corrections to multi-leg reactions.

Accurate computations
Expertise

EW/SUSY/QCD tools for loop calculations

- Sloops
- golem95
- DM@NLO

NLO computations (programs)

- Di-photon/hadron, photon/hadron and jet production in pp, ep, pA and AA collisions : DiPhox and JetPhox
- $p\,p \to H\,b\,\bar{b}$, $e^+\,e^- \to Z\,Z\,Z\,(W^+\,W^-\,Z)$
- heavy quark production
- proton partonic densities
- $p\,p \to Z\,Z(W\,W)$ jet, $g\,g \to \gamma\,\gamma\,g$, $q\,\bar{q} \to b\,\bar{b}\,b\,\bar{b}$, $\gamma\,\gamma \to \gamma\,\gamma\,\gamma\,\gamma$

Theoretical project yet strongly motivated by LHC experiments

- The merging of golem95 and Sloops
- NLO corrections (QCD, EW) to important reactions for the understanding of Standard model or for the estimate of the background : for instance $W\ W \to W\ W\ W\ W$ or $p\ p \to \gamma\ \gamma +$ n jets

Manpower to carry through the projects

- Post-doc for autumn 2013
- Doctoral students