The Centre for Cosmology, Particle Physics and Phenomenology (CP3) of the Université catholique de Louvain (UCL) in Louvain-la-Neuve (Belgium) invites applications for a two-year position at the post-doctoral level to join the efforts in advancing the matrix-element method(s) so to significantly extend the range of physics applications at the LHC to the (direct and indirect) search of new physics.

Research activity in CP3 is equally strong on the theoretical as well as on the experimental and instrumental fronts. It is conducted by ten faculty members, several post-doctoral fellows and many Ph.D. students. The main experimental collaborations include the CMS experiment at CERN, NA62 and the Planck mission. The CMS members currently focus on data analysis and related physics object software development within the electroweak, exotica, Higgs, top quark, forward, simulation, muon and b-tagging groups. UCL hosts one of the Tier-2 centers of the LHC computing GRID that allows CMS data to be processed and analyzed. The group is also involved in research and development programs related to possible extensions of the CMS experiment and to the Super-LHC. On the phenomenological side a strong Monte Carlo development activity is present focused on the development of a wide range of tools, such as FeynRules, MadGraph, aMC@NLO, and Delphes.

In the context of this project, we aim at four main objectives:

1. Provide the experimental HEP community with methods and tools (MadWeight) to allow the application of the matrix element method in an automatic way for any process in the SM and BSM, for any final state signature, including a transfer function library and the effects of extra QCD radiation at various levels of accuracy.
2. Provide the HEP community with a fast and reliable detector simulation package, Delphes, to be used both by theorists and experimentalists for phenomenological studies, and in particular can serve for the efficient determination of the transfer functions employed in the MEM.
3. Validate and apply and extend the new tools and methods to current experimental analyses in signatures that involve final state leptons and b-jets, such as those arising in Higgs, Top and Higgs-top physics studies.
4. Significantly extend the use of the MEM method in both top-down and bottom-up searches of new physics.

The selected candidate is expected to significantly contribute to one or more of the above aims in close contact with members of the CMS collaboration and of the theorists in CP3. The main focus will be on the development of novel analysis techniques based on these tools and the application of the techniques on real cases.

Applicants must have a Ph.D. in particle physics, received not earlier than 7 years before the beginning of the appointment. The selected candidate will be based in Belgium with possibility of stays at CERN. Appointment is for two years with possibility of future extensions depending on availability of funds and performance, and it is open to candidates of any nationality. Although the position will remain open until a suitable candidate is found, interested persons are encouraged to apply before Monday February 25, 2013, when the first application screening will take place. Applications, including curriculum vitae, a list of publications and at least two letters of recommendation should be submitted online at the following URL: http://cp3.irmp.ucl.ac.be/Jobs/Details/CP3-13-ASAP-PostDoc

More information can be obtained from:
Christophe Delaere christophe.delaere@uclouvain.be
Andrea Giammanco andrea.giammanco@uclouvain.be