Emanuele Angelo Bagnaschi

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Nationality: Italian.
Beginning date: October, 2011.
Education:

- Bachelor degree in Physics at the University of Milano.
- Master degree in Physics at the University of Milano.

Current position: PhD student at Laboratoire de Physique Theorique et des Hautes Energies (LPTHE)
City: Paris (France)
Supervisor: Matteo Cacciari (LPTHE)
Co-Supervisor: Giuseppe Degrassi (Università and INFN of Rome 3)
Work Packages: 2 (Discovery), 3 (Support to the experiment)

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Talk structure

PhD project: Higgs physics

PhD project: Theoretical uncertainties

Internship at Wolfram

Other activities and projects

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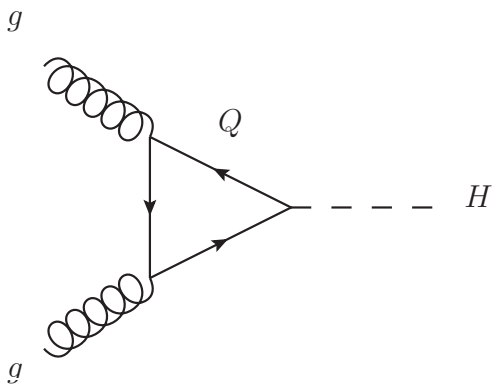
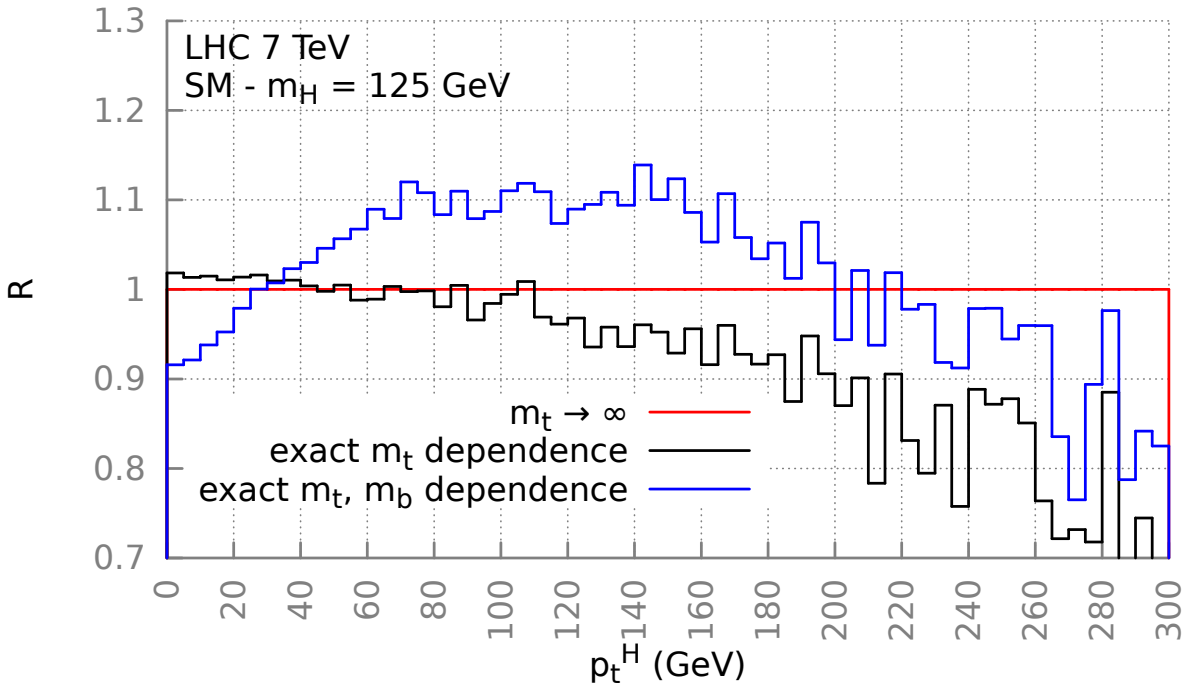
PhD project: Higgs physics

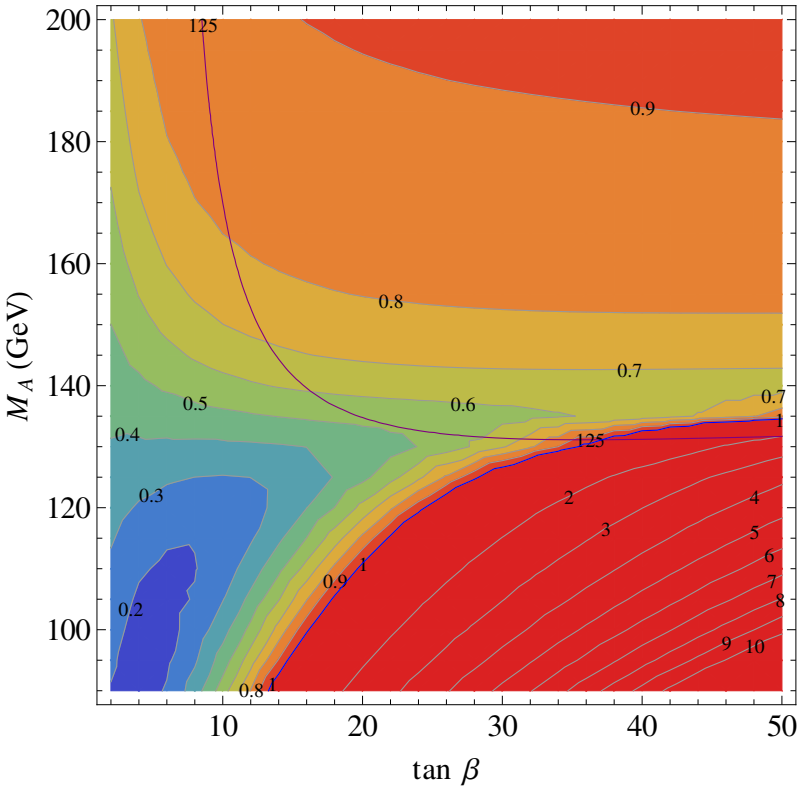
- **Fact**: Experiments use software (the so called Monte Carlo event generator) to simulate collision at colliders.
- **Goal**: Provide the experiments with a generator in the POWHEG-BOX framework, which implements the best results possible for the Higgs production process of gluon fusion (the most important production channel at the LHC).

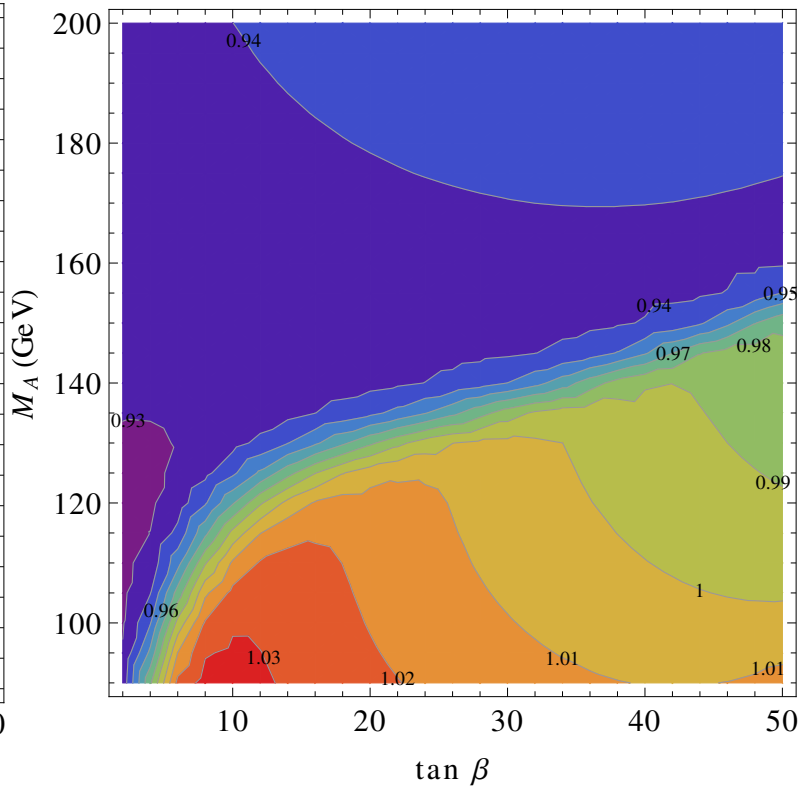


- Includes the most accurate prediction available to the context of the POWHEG-BOX framework.



- **Features**: Has possibility to simulate both Standard Model (SM) and supersymmetric model (MSSM).





- **Results**: An article was published and the code for the Standard Model was make publicly available and well received by the experiments.
- Collaboration with G. Degrassi (INFN and University of Rome 3), P. Slavich (LPTHE), A. Vicini (INFN and University of Milan).
- Continuous support to the experiments and implementation of new theoretical results as their available.

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PhD project: Theoretical uncertainties

- **Fact**: We are not able to calculate more than a few orders of the expression of the observables we measure at the LHC.
- **Goal**: Provide a consistent framework for the estimation of uncertainties which come from this partial knowledge.
- Collaboration with M. Cacciari, A. Guffanti and L. Jenniches (Nielse Bohr institute - Copenhagen).

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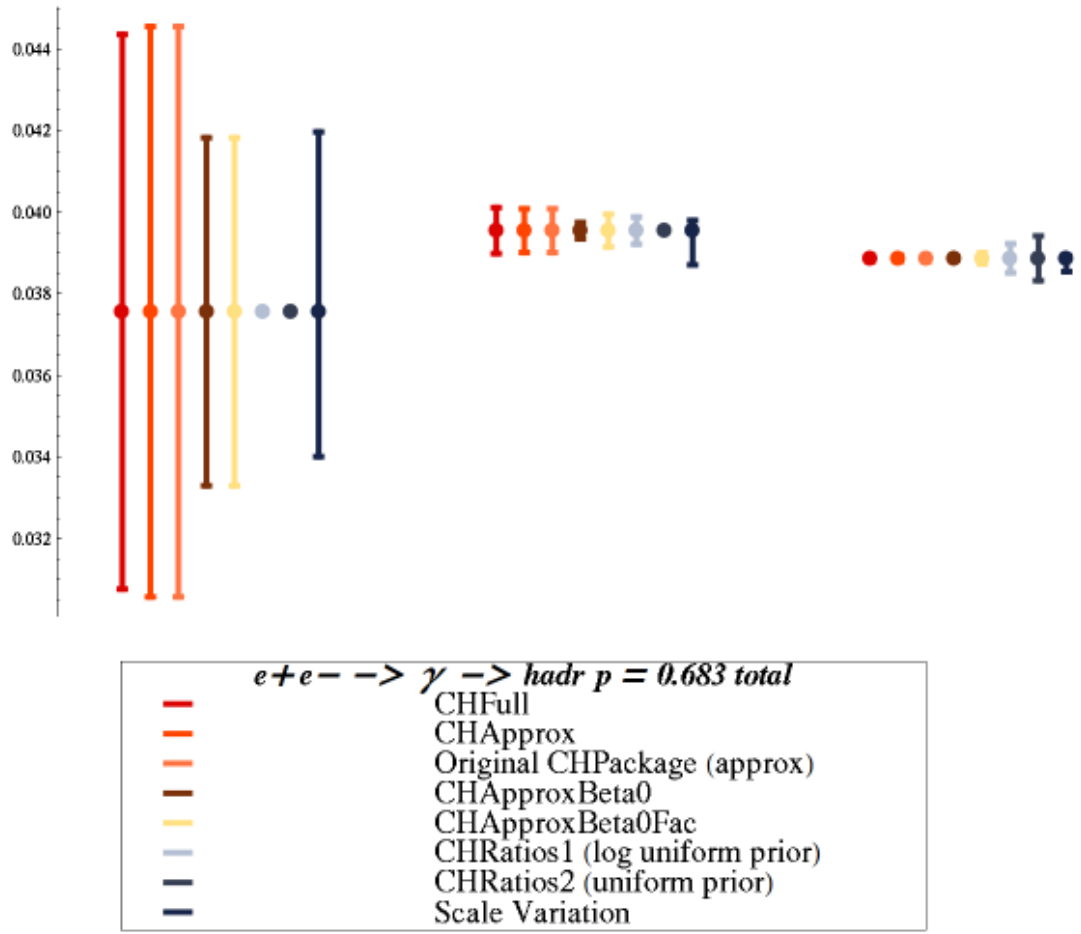

0.044
0.042
0.040
0.038
0.036
0.034
0.032
e+e− −> γ −> hadr p = 0.683 total
CHFull
CHApprox
Original CHPackage (approx)
CHApproxBeta0
CHApproxBeta0Fac
CHRatios1 (log uniform prior)
CHRatios2 (uniform prior)
Scale Variation

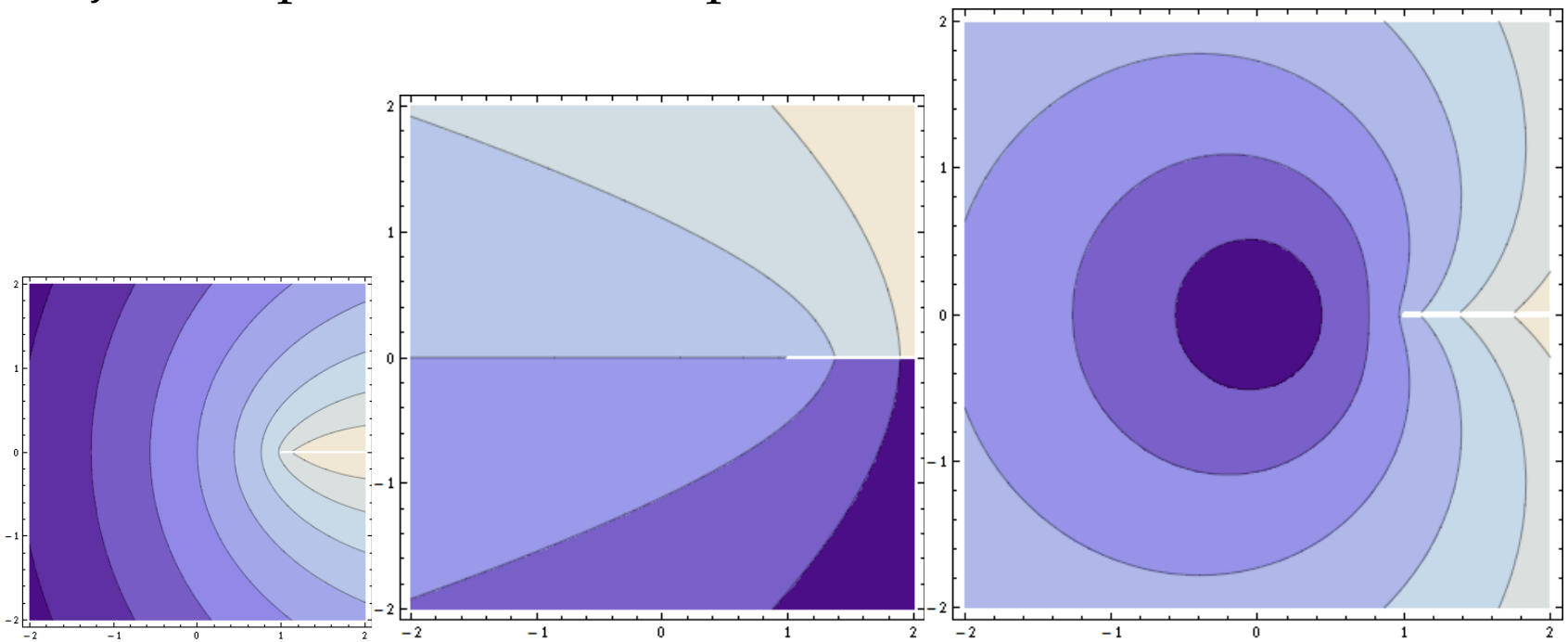
Internship at Wolfram Research

Fact: Mathematica is one of the most widely used software for manipulating complex symbolic expression.
Goals:

- Improve Mathematica skills with the help of the supervision of those who have written Mathematica.
- Experience in an industry working environment.
- Training period: 09/12 - 12/12

Internship at Wolfram Research

Supervisor: Oleskandr Pavlyk.
Project: implementation of special functions in Mathematica.



Other activities

Purely academic:

- MSSM course by U. Ellwanger at Ecolé Normale Superieure (ENS) (2011).
- Other physics courses, not strictly related to the PhD project during 2012 with the aim of enlarging the knowledge-base.

Other subjects:

- French courses at Université Paris Diderot (2011/2012/2013).
- Certificat “doctorant manager” sponsored by the Ecole Doctorale (2012/2013).

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Conferences,workshops and summer school attended

- **Summer school**: "School of Analytic Computing in Theoretical High-Energy Physics" in Atrani (2011)
- **Winter school**: "LHCPhenonet Winter School 2012" in Ascona (2011). Participation in the student session.
- **Workshop**: "Think Tank Physics @LHC' based on theme Monte Carlo event generators and jet physics" in Rajastan, India (2011)
- **Workshop**: "Higgs cross section working group meeting" CERN (2011)
- **Conference**: "Hadrons and Colliders Symposium" in Paris (2011)
- **Conference**: "Higgs hunting" in Orsay (2012). Participation in the student session.

Publications

E. Bagnaschi, G. Degrassi, P. Slavich, and A. Vicini.

Higgs production via gluon fusion in the POWHEG approach in the SM and in the MSSM.

JHEP, 1202:088, 2012.

S. Dittmaier, S. Dittmaier, C. Mariotti, G. Passarino, R. Tanaka, et al.

Handbook of LHC Higgs Cross Sections: 2. Differential Distributions.

2012.