

Giuseppe Bevilacqua

Curriculum Vitæ

Personal data

First name: Giuseppe
Last name: Bevilacqua
Date of Birth: October 11, 1981
Place of Birth: Torino (Italy)
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Education

- 2005 - 2008 **PhD studies in Physics, Turin University.**
Acquired skills in multi-parton scattering calculations and advanced Monte Carlo methods with applications to collider phenomenology.
- 2003 - 2005 **MSc studies in Physics, Turin University.**
Training path oriented in theoretical physics of fundamental interactions and phenomenology at colliders.
- Jun-Aug 2003 **Summer Internship, CERN.**
I developed my Bachelor's thesis project in collaboration with the Torino CMS group, also participating in the activities of the CERN Summer Student Programme.
- 2000 - 2003 **BSc studies in Physics, Turin University.**

Academic qualifications

- 28/03/2017 **National Scientific Qualification, Italian Ministry of Education, University and Research (MIUR) .**
Habilitation to the functions of Associate Professor for the Italian Academic system.
Class of habilitation: 02/A2 - Theoretical Physics of Fundamental Interactions.
- 10/11/2008 **PhD in Physics, Turin University.**
Thesis: "Vector Boson Scattering as a probe of Electroweak Symmetry Breaking: a six-fermion perspective"
Advisor: Dr. A. Ballestrero

22/07/2005 **Master's Degree in Physics, Turin University.**
Thesis: "QCD contributions for six-fermion physics at the LHC"
Advisor: Dr. A. Ballestrero
Mark: 110/110 with honors

26/09/2003 **Bachelor's Degree in Physics, Turin University.**
Thesis: "Digitization of the CMS Drift Tube Chambers"
Advisors: Prof. A. Romero, Dr. N. Amapane
Mark: 110/110 with honors

Positions held

- 10/2015 - present **Senior Research Fellow, MTA-DE Particle Physics Research Group, Debrecen (Hungary).**
- 10/2013 - 10/2015 **INFN Postdoctoral Fellow, Istituto Nazionale di Fisica Nucleare, Laboratori Nazionali di Frascati, Frascati (Italy).**
- 12/2010 - 10/2013 **Postdoctoral Associate, Rheinisch-Westfälische Technische Hochschule, Aachen (Germany).**
- 12/2008 - 12/2010 **Marie Curie RTN Experienced Researcher, National Center for Scientific Research "Demokritos", Athens (Greece).**

Teaching experience

- 2011 - 2013 **Teaching Assistant, RWTH Aachen.**
Responsibilities: preparation of independent cycles of exercises, management of frontal sessions with students, correction of homeworks.
Courses assigned:
- Quantum Field Theory II (2011)
- Quantum Field Theory I (2012)
- Quantum Field Theory II (2012)
- The Singular Nature of Quantum Field Theory (2013)
My Teaching Assistance has been evaluated receiving an overall rate between 1 and 2, following a scale of 1 (fully satisfied) to 5 (very dissatisfied). *Source:* RWTH Student Evaluation of the quality of teaching.

Organizing experience

- 2014 **XVII Frascati Spring School "Bruno Touschek", Laboratori Nazionali di Frascati, May 12-16, 2014.**
Member of the Local Organizing Committee.
- 2017 **QCD@LHC 2017, Debrecen University, August 28 - September 1, 2017.**
Member of the Local Organizing Committee. Coordinator for the session *Top, heavy quarks and searches.*

Participation in research projects and networks

- 2015 - present **MTA-DE Particle Physics Research Group.**
Funding source: Hungarian Scientific Research Fund.
Responsibilities:
- extend the CoLorFuNNLO framework for NNLO calculations to coloured initial states;
 - contribute to the construction of a program library implementing the method in a process-independent way;
 - improve state-of-the-art description of $t\bar{t}$ + jet production with applications to the extraction of top-quark mass at the LHC.
- 2013 - 2015 **Iniziativa Specifica PhenoLNF.**
Funding source: INFN.
Responsibilities:
- improve computation of high-multiplicity processes in the HELAC-NLO framework;
 - perform detailed NLO analyses of the associated production of top quark pairs at the LHC (search for correlations in $t\bar{t}b\bar{b}$ and $t\bar{t}jj$ production, study of $t\bar{t}j$ production with off-shell effects at the LHC).
- 2010 - 2013 **SFB/TR9 "Computational Particle Physics".**
Funding source: German Research Foundation (DFG).
Responsibilities:
- complete the construction of the Nagy-Soper subtraction scheme for NLO calculations;
 - implement the new subtraction scheme in the HELAC-NLO framework;
 - perform NLO QCD calculations of interest for heavy-quark phenomenology at the LHC ($t\bar{t}t\bar{t}$, $b\bar{b}b\bar{b}$ hadroproduction).
- 2008 - 2010 **HEPTOOLS - Tools and Precision Calculations for Physics Discoveries at Colliders.**
Funding source: European Commission (MRTN-CT-2006-035505).
Responsibilities:
- contribute to the development of HELAC-NLO, a framework for automated NLO QCD calculations;
 - perform NLO QCD studies of key processes for the LHC Runs I and II ($t\bar{t}b\bar{b}$, $t\bar{t}jj$, $b\bar{b}WW$ hadroproduction).

Language skills

- *Italian:* native proficiency
- *English:* full professional proficiency (C1)
- *French:* limited working proficiency (B2)
- *German:* elementary proficiency (A2)
- *Greek:* elementary proficiency (A2)

(Levels: A1/2 Basic – B1/2 Intermediate – C1/2 Advanced.
Common European Framework of Reference for Languages)

Computing skills

- Programming languages: C/C++, Fortran, basics of Java
- Scripting languages: C-Shell, Bash
- Editing: \LaTeX , Word

- Symbolic Calculus and Data Analysis: Mathematica™, FORM, ROOT
- Co-author of the following Monte Carlo programs for high-energy particle scattering computations:
 - HELAC-1LOOP
<http://helac-phegas.web.cern.ch/helac-phegas/helac-1loop.html>
 - HELAC-DIPOLES
<http://helac-phegas.web.cern.ch/helac-phegas/helac-dipoles.html>
 - PHANTOM
<http://personalpages.to.infn.it/~ballestr/phantom/>

Conference talks and seminars

- *"Off-shell effects in top pair production with jet activity at the LHC"*, invited seminar. Eötvös Loránd University (Budapest) February 22, 2017
- *"Top-antitop + jet production with off-shell effects at NLO QCD"*, talk. Sixth International Workshop on High Precision for Hard Processes at the LHC (HP2 2016), ICAS-UNSAM (Buenos Aires), September 8, 2016
- *"Complete off-shell effects for top-antitop + jet production with leptonic decays at the LHC"*, talk. DIS2016, DESY Hamburg, April 13, 2016
- *"Off-shell, off-the-shelf: top quark pair production with jet activity at the LHC"*, seminar. Debrecen University, December 1, 2015
- *"NLO predictions on the ratio of $t\bar{t}b\bar{b}$ and $t\bar{t}jj$ cross sections at the LHC"*, talk. HP2 Workshop, Galileo Galilei Institute (Florence), September 3, 2014
- *"On the ratio of $t\bar{t}b\bar{b}$ and $t\bar{t}jj$ cross sections at the LHC"*, talk. LNF Spring Institute "High-energy physics after LHC Run I", March 14, 2014
- *"Nagy-Soper subtraction for NLO calculations: overview and applications"*, seminar. Laboratori Nazionali di Frascati, November 18, 2013
- *"Recent developments with HELAC-NLO"*, invited talk. QCD@LHC2013, DESY Hamburg, September 4, 2013
- *"NLO mass effects in $b\bar{b}b\bar{b}$ production at the LHC"*, talk. 19th Meeting of SFB/TR9, Aachen, March 19, 2013
- *"Back to Top: production, decay and jet activity at hadron colliders"*, invited seminar. Freiburg University, November 6, 2012
- *"HELAC-NLO: recent developments and phenomenological results"*, invited talk. LoopFest XI, Pittsburgh, May 12, 2012
- *"The Nagy-Soper NLO subtraction method in QCD"*, talk. 16th Meeting of SFB/TR9, Aachen, November 15, 2011
- *"The HELAC framework for NLO calculations: overview and phenomenological applications"*, seminar. RWTH Aachen, November 10, 2011
- *"Recent progress in theoretical predictions for top-pair phenomenology"*, invited talk. Helmholtz Alliance Workshop on Top Quark Physics, Wuppertal, April 7, 2011

- "Complete off-shell effects in $t\bar{t}$ hadroproduction with leptonic decay at NLO", talk. DPG Frühjahrstagung 2011, Karlsruhe, March 30, 2011
- "NLO QCD corrections to $W^+W^-b\bar{b}$ production at hadron colliders", talk. HEP-TOOLS Final Meeting, Granada, November 26, 2010
- "NLO QCD calculations with HELAC-NLO", invited seminar. Turin University, September 21, 2010
- "A NLO study of $t\bar{t}b\bar{b}$ at the LHC", invited seminar. University of Granada, January 14, 2010
- "NLO QCD corrections to $t\bar{t}b\bar{b}$ production: the HELAC-NLO perspective", invited seminar. Zurich University, December 8, 2009
- "NLO QCD corrections to $t\bar{t}b\bar{b}$ production at the LHC", talk. Third HEPTOOLS Annual meeting, Vienna, November 30, 2009
- "Recent developments in automated NLO calculations", talk. Workshop on the Standard Model and Beyond - Standard Cosmology, Corfu Summer Institute, August 31, 2009
- "Probing EWSB at LHC and ILC: Vector Boson Scattering from a six-fermion perspective", seminar. Turin University, November 25, 2008
- "PHANTOM: a Monte Carlo event generator for six parton final states at high energy colliders", invited talk. ILC-ECFA Workshop, Warsaw, June 10, 2008
- "Vector Boson Scattering at LHC: a six-fermion perspective", invited talk. IFAE 2008, Bologna, March 27, 2008
- "PHANTOM at ILC", talk. "ILC Physics in Florence", Galileo Galilei Institute (Florence), September 14, 2007
- "Physics studies at the LHC with PHANTOM", talk. Workshop on Monte Carlo's, Physics and Simulations at the LHC, Laboratori Nazionali di Frascati, October 23, 2006

Publications

- [1] G. Bevilacqua, H. B. Hartanto, M. Kraus and M. Worek, "Off-shell Top Quarks with One Jet at the LHC: A comprehensive analysis at NLO QCD". JHEP 1611 (2016) 098 [arXiv:1609.01659 [hep-ph]]
- [2] G. Bevilacqua, "Complete off-shell effects for top-antitop + jet production with leptonic decays at the LHC". PoS DIS2016 (2016) 151 [arXiv:1606.09501 [hep-ph]]
- [3] G. Bevilacqua, H. B. Hartanto, M. Kraus and M. Worek, "Top Quark Pair Production in Association with a Jet with NLO QCD Off-Shell Effects at the Large Hadron Collider". Phys. Rev. Lett. 116 (2016) 5, 052003 [arXiv:1509.09242 [hep-ph]].
- [4] G. Bevilacqua and M. Worek, "On the ratio of $t\bar{t}b\bar{b}$ and $t\bar{t}j$ cross sections at the CERN Large Hadron Collider". JHEP1407 (2014) 135 [arXiv:1403.2046 [hep-ph]].
- [5] G. Bevilacqua, M. Czakon, M. Kubocz and M. Worek, "Complete Nagy-Soper subtraction for next-to-leading order calculations in QCD". JHEP1310 (2013) 204 [arXiv:1308.5605 [hep-ph]].

- [6] G. Bevilacqua, M. Czakon, M. Krämer, M. Kubocz and M. Worek, "Quantifying quark mass effects at the LHC: A study of $pp \rightarrow b\bar{b}b\bar{b} + X$ at next-to-leading order". JHEP1307 (2013) 095 [arXiv:1304.6860 [hep-ph]].
- [7] G. Bevilacqua, M. Czakon, M. V. Garzelli, A. van Hameren, A. Kardos, C. G. Papadopoulos, R. Pittau and M. Worek, "HELAC-NLO". Comput. Phys. Commun. 184 (2013) 986 [arXiv:1110.1499 [hep-ph]].
- [8] G. Bevilacqua and M. Worek, "Constraining BSM Physics at the LHC: Four top final states with NLO accuracy in perturbative QCD". JHEP1207 (2012) 111 [arXiv:1206.3064 [hep-ph]].
- [9] M. Kubocz, G. Bevilacqua, M. Czakon, M. Krämer and M. Worek, "Alternative subtraction method in QCD using Nagy-Soper scheme". PoS RADCOR2011 (2011) 019.
- [10] G. Bevilacqua, M. Czakon, C. G. Papadopoulos and M. Worek, "Hadronic top-quark pair production in association with two jets at Next-to-Leading Order QCD". Phys. Rev. D84, 114017 (2011) [arXiv:1108.2851 [hep-ph]].
- [11] G. Bevilacqua, M. Czakon, A. van Hameren, C. G. Papadopoulos and M. Worek, "Complete off-shell effects in top quark pair hadroproduction with leptonic decay at next-to-leading order". JHEP1102 (2011) 083 [arXiv:1012.4230 [hep-ph]].
- [12] G. Bevilacqua, M. Czakon, M. V. Garzelli, A. van Hameren, Y. Malamos, C. G. Papadopoulos, R. Pittau and M. Worek, "NLO QCD calculations with HELAC-NLO". Nucl. Phys. Proc. Suppl. 205-206 (2010) 211 [arXiv:1007.4918 [hep-ph]].
- [13] G. Bevilacqua, "Recent developments in automated NLO calculations: the HELAC-NLO case". Fortschr. Phys 58, No. 7-9, 651-655 (2010).
- [14] G. Bevilacqua, M. Czakon, M. V. Garzelli, A. van Hameren, C. G. Papadopoulos, R. Pittau and M. Worek, "A NLO study of $t\bar{t}H \rightarrow t\bar{t}b\bar{b}$ signal versus $t\bar{t}b\bar{b}$ background". Published in the report of the SM and NLO Multileg Working Group for the Workshop "Physics at TeV Colliders", Les Houches, France 8-26 June, 2009 [arXiv:1003.1241 [hep-ph]].
- [15] G. Bevilacqua, M. Czakon, C. G. Papadopoulos and M. Worek, "Dominant QCD Backgrounds in Higgs Boson Analyses at the LHC: A Study of $pp \rightarrow t\bar{t} + 2$ jets at Next-To-Leading Order". Phys. Rev. Lett. 104 (2010) 162002 [arXiv:1002.4009 [hep-ph]].
- [16] A. Ballestrero, G. Bevilacqua, D. B. Franzosi and E. Maina, "How well can the LHC distinguish between the SM light Higgs scenario, a composite Higgs and the Higgsless case using VV scattering channels?". JHEP0911 (2009) 126 [arXiv:0909.3838 [hep-ph]].
- [17] G. Bevilacqua, M. Czakon, C. G. Papadopoulos, R. Pittau and M. Worek, "Assault on the NLO Wishlist: $pp \rightarrow t\bar{t}b\bar{b}$ ". JHEP0909 (2009) 109 [arXiv:0907.4723 [hep-ph]].
- [18] G. Bevilacqua, "Physics studies at the LHC with PHANTOM". Proceedings of the Workshop on Monte Carlo's, Physics and Simulations at the LHC, Ed. P Nason, Frascati Physics Series, Volume XLIX, ISBN 978-88-86409-58-2.
- [19] A. Ballestrero, G. Bevilacqua, E. Maina, "A complete parton level analysis of boson-boson scattering and ElectroWeak Symmetry Breaking in $\ell\nu +$ four jets production at the LHC". JHEP0905 (2009) 015 [arXiv:0812.5084 [hep-ph]].

- [20] A. Ballestrero, A. Belhouari, G. Bevilacqua, V. Kashkan, E. Maina, "*PHANTOM: a Monte Carlo generator for six parton final states at high energy colliders*". *Comput. Phys. Commun.* 180 (2009) 401 [arXiv:0801.3359 [hep-ph]].
- [21] G. Bevilacqua, "*Vector Boson Scattering at LHC from a six fermion perspective*". *Nuovo Cim.* 123B (2008) 6.
- [22] A. Ballestrero, G. Bevilacqua, E. Maina, "*A new analysis of $pp \rightarrow bbl\nu jj$ at the LHC: Higgs and W boson associated production with two tag jets*". *JHEP*0808 (2008) 059 [arXiv:0806.4075v1 [hep-ph]].
- [23] N. Amapane, A. Ballestrero, R. Bellan, G. Bevilacqua, S. Bolognesi, D. Franzosi, G. Cerminara, P. Govoni, E. Maina, C. Mariotti, G. Mila, M. Paganoni, G. Petrillo, A. Sznajder, V. Tancini, "*Study of VV -scattering processes as a probe of electroweak symmetry breaking*". *CMS Analysis Note 2007/005*.
- [24] E. Accomando, N. Amapane, A. Ballestrero, A. Belhouari, R. Bellan, G. Bevilacqua, S. Bolognesi, G. Cerminara, V. Kashkan, E. Maina, C. Mariotti, " *VV -fusion in CMS: a model-independent way to investigate EWSB*". Published in the report of *CP Studies and Non-Standard Higgs Physics (CPSNH) Workshop, CERN-2006-009* [hep-ph/0608079].

References

The following senior scientists are available to provide information about myself if contacted at the email addresses listed below.

Dr. Alessandro Ballestrero, *INFN*.

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