

# Marco Bonvini

## SCIENTIFIC CURRICULUM

Deutsches Elektronen-Synchrotron (DESY),  
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## Personal information

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*First Name:* Marco  
*Last Name:* Bonvini  
*Date of birth:* November 10, 1984  
*Place of birth:* Genoa, Italy  
*Nationality:* Italian  
*Marital status:* Married  
*Current Address:* Von-Sauer-Straße 1b,  
D-22761, Hamburg, Germany

## Education

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Ph.D. in Physics, University of Genoa, February 2012

*Supervisors:* prof. [Giovanni Ridolfi](#), prof. [Stefano Forte](#)

*Title:* [Resummation of soft and hard gluon radiation in perturbative QCD](#)

*arXiv:* [1212.0480 \[hep-ph\]](#)

Master degree in Physics, University of Genoa, September 2008

*Supervisor:* prof. [Giovanni Ridolfi](#)

*Grade:* 110/110 cum laude

*Title:* [Divergent series and physical observables: the resummed cross-section in the soft emission limit in QCD](#)

Bachelor degree in Physics, University of Genoa, July 2006

*Supervisor:* prof. [Enrico Massa](#)

*Grade:* 110/110 cum laude

*Title:* [Pure Lorentz transformations and reflection operators and their application to the study of Fermi-Walker transport law and Thomas precession](#)

High school Diploma, Liceo scientifico Leonardo Da Vinci (Genoa), 2003

*Grade:* 100/100

## Employments

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### *Post-docs*

*DESY fellowship*, DESY Theory group, Hamburg, January 2012 to September 2014

### *During my Ph.D.*

*Unpaid associate* at CERN, Theory division, April–October 2011

*Teaching assistant*, General Physics course at Chemical and Electrical Engineering, University of Genoa, 2009–2010

*Didactic tutor* for first-year students in Physics, all courses, University of Genoa, March 2009 to December 2011

*Scientific supervisor* for high-school stages at Department of Physics, University of Genoa, 23 February to 5 March 2009 and 18–29 January 2010

### *Earlier*

*Collaboration contract* at University of Genoa, November–December 2008

*Supervisor*: prof. [Giovanni Ridolfi](#)

*Work*: preliminary study on threshold resummation of rapidity distributions

*Summer student programme* at CERN, July–August 2007

*Supervisor*: prof. Federico Antinori

*Work*: development of a software to tag  $b$ -jets from simulated data at the ALICE experiment at LHC

*Tutor orienter* for Physics course at University of Genoa, June 2005 to June 2008

*Scientific entertainer* at *Festival della Scienza* in Genoa, 1–8 November 2005

## Publications

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[[Full list](#) and [Author Profile](#) on inSPIRE]

### *Journal Articles*

M. Bonvini and S. Marzani,  
“Resummed Higgs cross section at  $N^3LL$ ,”  
submitted to JHEP [[arXiv:1405.3654](#) [[hep-ph](#)]].

M. Bonvini, R. D. Ball, S. Forte, S. Marzani and G. Ridolfi,  
“Updated Higgs cross section at approximate  $N^3LO$ ,”  
to be published in JPG [[arXiv:1404.3204](#) [[hep-ph](#)]].

M. Bonvini, F. Caola, S. Forte, K. Melnikov and G. Ridolfi,  
“Signal-background interference effects for  $gg \rightarrow H \rightarrow W^+W^-$  beyond leading order,”  
*Phys. Rev. D* **88** (2013) 034032 [[arXiv:1304.3053](#) [[hep-ph](#)]].

- R. D. Ball, M. Bonvini, S. Forte, S. Marzani and G. Ridolfi,  
 “Higgs production in gluon fusion beyond NNLO,”  
 Nucl. Phys. B **874** (2013) 746 [arXiv:1303.3590 [hep-ph]].
- M. Bonvini, S. Forte, and G. Ridolfi,  
 “The Threshold region for Higgs production in gluon fusion,”  
 Phys. Rev. Lett. **109** (2012) 102002 [arXiv:1204.5473 [hep-ph]].
- M. Bonvini, S. Forte, M. Ghezzi and G. Ridolfi,  
 “Threshold resummation in SCET vs. perturbative QCD: an analytic comparison,”  
 Nucl. Phys. B **861** (2012) 337 [arXiv:1201.6364 [hep-ph]].
- M. Bonvini, S. Forte and G. Ridolfi,  
 “Soft gluon resummation of Drell-Yan rapidity distributions: theory and phenomenology,”  
 Nucl. Phys. B **847** (2011) 93 [arXiv:1009.5691 [hep-ph]].
- M. Bonvini, S. Forte and G. Ridolfi,  
 “Borel resummation of transverse momentum distributions,”  
 Nucl. Phys. B **808** (2009) 347 [arXiv:0807.3830 [hep-ph]].

### Conference Proceedings

- M. Bonvini,  
 “An approximate NNNLO cross section for Higgs production in gluon fusion,”  
 EPJ Web Conf. **60** (2013) 12008 [arXiv:1306.6633 [hep-ph]].
- M. Bonvini, S. Forte, M. Ghezzi and G. Ridolfi,  
 “The scale of soft resummation in SCET vs perturbative QCD,”  
 Nucl. Phys. Proc. Suppl. **241-242** (2013) 121 [arXiv:1301.4502 [hep-ph]].
- M. Bonvini,  
 “Threshold resummation for Drell-Yan production: theory and phenomenology,”  
 PoS **DIS2010** (2010) 100 [arXiv:1006.5918 [hep-ph]]

### Talks and Seminars

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#### Invited

- Precision phenomenology from resummations: the Higgs cross section,*  
 invited seminar at University of Rome La Sapienza, Rome, Italy, 30-06-2014
- Higgs production in gluon fusion beyond NNLO,*  
 invited talk at *Parton shower, event generators and resummation (PSR 2014)*, Münster, Germany, 10-06-2014
- Higgs production in gluon fusion at approximate  $N^3LO$ ,*  
 invited talk at *QCD@LHC 2013*, Hamburg, Germany, 05-09-2013
- Threshold resummation in SCET vs pQCD: an analytic comparison,*  
 invited seminar at University of Münster, Germany, 06-05-2013
- Precise determination of the Higgs production cross-section at the LHC,*  
 invited seminar at DESY, Hamburg, Germany, 12-11-2012
- Threshold resummation in SCET vs pQCD: an analytic comparison,*  
 invited seminar at IPPP, Durham, United Kingdom, 08-11-2012

*Others*

*An EFT approach to initial-state heavy quarks,*  
at [Xlth Annual Workshop on Soft-Collinear Effective Theory \(SCET 2014\)](#), Munich, Germany, 26-03-2014

*Higgs production in gluon fusion beyond NNLO,*  
at [First Large Hadron Collider Physics Conference \(LHCP 2013\)](#), Barcelona, Spain, 14-05-2013

*Higgs production in gluon fusion beyond NNLO,*  
at [77. Jahrestagung der DPG und DPG-Frühjahrstagung](#), Dresden, Germany, 05-03-2013

*Validity of the soft approximation and the impact of higher order corrections in Higgs production in gluon fusion,*  
at the [TH/LPCC Institute on Standard Model at the LHC](#), CERN, Geneva, Switzerland, 04-10-2012

*Three blackboard seminars on Instantons and Borel summation of divergent series,*  
at the students' Informal Journal Club, CERN, Geneva, Switzerland, summer 2011

*Threshold resummation for Drell-Yan production: theory and phenomenology,*  
at the [3<sup>rd</sup> International Workshop on High Precision for Hard Processes at the LHC](#), Florence, Italy, 16-09-2010

*Threshold resummation for Drell-Yan production: theory and phenomenology,*  
at the [XVIII International Workshop on Deep-Inelastic Scattering and Related Subjects](#), Florence, Italy, 20-04-2010

*Borel prescription for threshold resummation,*  
at the [Convegno Informale di Fisica Teorica](#), Sestri Levante, Italy, 08-06-2009

*Ambiguities in resummation prescriptions,*  
at the [W mass workshop](#), Milan, Italy, 17-03-2009

## Workshops and conferences

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*With contribution*

*Parton shower, event generators and resummation (PSR 2014)*, Münster, Germany, 10–12 June 2014

*Xlth Annual Workshop on Soft-Collinear Effective Theory (SCET 2014)*, Munich, Germany, 26–28 March 2014

*QCD@LHC 2013*, DESY, Hamburg, 02–06 September 2013

*First Large Hadron Collider Physics Conference (LHCP 2013)*, Barcelona, Spain, 13–18 May 2013

*77. Jahrestagung der DPG und DPG-Frühjahrstagung*, Dresden, Germany, 05 March 2013

*TH/LPCC Institute on Standard Model at the LHC*, CERN, Geneva, Switzerland, 01–05 October 2012

*3<sup>rd</sup> International Workshop on High Precision for Hard Processes at the LHC*, Florence, Italy, 14–17 September 2010

*XVIII International Workshop on Deep-Inelastic Scattering and Related Subjects*, Florence, Italy, 19–23 April 2010

*Convegno Informale di Fisica Teorica*, Sestri Levante, Italy, 08–10 June 2009

*W mass workshop*, Milan, Italy, 17–18 March 2009

## Without contribution

*6th Annual Helmholtz Alliance Workshop on "Physics at the Terascale"*, DESY, Hamburg, 03–05 December 2012

*Lessons from the first phase of the LHC*, DESY Theory Workshop, DESY, Hamburg, 25–28 September 2012

*Planck 2010, From the Planck Scale to the ElectroWeak Scale*, CERN, Geneva, Switzerland, 31 May to 4 June 2010

*Convegno Informale di Fisica Teorica*, Sestri Levante, Italy, 04–06 June 2008

## Schools

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*Monte Carlo School 2012*, DESY Hamburg, Germany, 12–16 March 2012

*LACES 2010, Advanced lectures on Fields and Strings*, Florence, Italy, 22 November to 10 December 2010

*LACES 2009, Advanced lectures on Fields and Strings*, Florence, Italy, 23 November to 11 December 2009

*The 2009 European school of High-Energy Physics*, Bautzen, Germany, 14–27 June 2009

*Summer school in the context of Summer student programme* at CERN, July–August 2007

## Codes

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<code>ggHiggs</code>	Higgs inclusive cross-section in gluon fusion with full $m_t$ dependence up to NNLO (exact) and NNNLO (approximate)
<code>ResHiggs</code>	Higgs inclusive cross-section in gluon fusion with full $m_t$ dependence at resummed NNNLL accuracy
<code>ReDY</code>	Resummed Drell-Yan inclusive cross-section differential in invariant mass $M^2$ and rapidity $Y$ at hadron collider up to NNLO+NNLL
<code>bbHiggs</code>	Higgs production with bottom quarks, resumming collinear logarithms while keeping bottom mass dependence (private code)
<code>bg2bh</code>	Higgs plus $b$ -jet with bottom quark mass effects (private code, in development)
<code>SmaXres</code>	Small- $x$ resummation of DGLAP splitting functions (private code)
<code>HELL</code>	Fast interface to <code>SmaXres</code> , plus small- $x$ resummation of coefficient functions (in development)

## Technical skills

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<i>Programming languages:</i>	C, C++, BASH scripting, PHP, HTML, CSS, L <sup>A</sup> T <sub>E</sub> X — very good knowledge Python, Fortran, SQL, JavaScript — basic knowledge
<i>Scientific libraries:</i>	ROOT, gsl, LHAPDF, GiNaC, Cuba — very good knowledge FeynCalc, FormCalc — good knowledge
<i>Scientific softwares:</i>	gnuplot, Mathematica — very good knowledge
<i>Operating systems:</i>	MacOS X, Linux — very good knowledge DOS, Microsoft Windows (all versions up to XP) — good but useless knowledge
<i>Networking:</i>	SSH, ftp, Apache, svn — good knowledge
<i>Editors:</i>	emacs — very good knowledge
<i>Applications:</i>	iWork, OpenOffice (and similar) — very good knowledge
<i>Notes:</i>	High ability in learning new languages and softwares. Experience in numerical analysis and simulations.
<i>Mother tongue:</i>	Italian
<i>Other languages:</i>	English — good knowledge French — intermediate knowledge German — basic knowledge

## Awards

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Productivity award from DESY, 2013, for  
*Research in collider phenomenology, in particular precision calculations for Higgs production at the LHC*

## Reference

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