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**[Nome e cognome]  
CURRICULUM VITAE**

**INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)**

<b>COGNOME</b>	<b>BROGGIO</b>
<b>NOME</b>	<b>ALESSANDRO</b>
<b>DATA DI NASCITA</b>	<b>[ 29,08,1984]</b>

**INSERIRE IL PROPRIO CURRICULUM  
(non eccedente le 30 pagine)**

## **Alessandro Broggio**

**Università degli Studi di Milano-Bicocca**  
**Dip. di Fisica “G. Occhialini”**  
**Piazza della Scienza, 3**  
**20126 Milano, Italy**  
**Telephone: +39 3343144750**  
**E-mail: [alessandro.broggio@unimib.it](mailto:alessandro.broggio@unimib.it)**

### **Personal Information**

Born: Bassano del Grappa, Italy, 29. August 1984

Citizenship: Italian

### **Employment History**

October 2018 -

Research fellow (5 year position), University of Milano-Bicocca, Milano, Italy.

October 2015 - September 2018

Post-doctoral fellow, Technical University of Munich, Munich, Germany.

December 2012 - September 2015

Post-doctoral fellow, Paul Scherrer Institute (PSI), Villigen, Switzerland.

### **Education**

January 2020

Habilitation as Associate Professor in Theoretical Physics given by the Italian University & Research Ministry (MIUR)

November 2009 - February 2013

Ph.D. in Physics, 1,0/1,0 magna cum laude, Johannes Gutenberg University of Mainz.

Thesis title: “*Applications of SCET to the pair production of supersymmetric particles at hadron colliders*”

Adviser: Prof. Dr. M. Neubert

October 2006 - October 2009

Master Degree in Theoretical Physics, 110/110 cum laude, University of Padova.

Thesis title: “*Quantum effects in the two Higgs doublet model*”

Supervisors: Dr. M. Passera (INFN Padova), Prof. Dr. G. Degrandi (University of Rome III)

October 2003 - October 2006

Bachelor Degree in Physics, University of Padova.

Thesis title: *"Search of hidden explosives with the technique of neutron radiography"*

Supervisor: Prof. G. Viesti

### Invited Seminars

September 2020, Theory Seminar, University of Padova, Italy, *"Resummation techniques for precision physics at the LHC"*.

May 2020, Theory Seminar, University of Pisa, Italy, *"Sudakov resummation for WIMP dark matter annihilation"*.

October 2019, Heavy-Quark Hadroproduction from Collider to Astroparticle Physics workshop, MITP Mainz, Germany; *"Resummation techniques for heavy-quark production and Dark Matter annihilation processes"*.

October 2018, Milan Joint Phenomenology Seminar, University of Milano-Bicocca, Milano, Italy, *"Sudakov resummation for WIMP dark matter annihilation processes"*.

July 2018, QFET Seminar, Universität Siegen, Siegen, Germany, *"Sudakov resummation for WIMP dark matter annihilation processes"*.

May 27 - Jun 1, 2018, Heavy Quarks and Leptons 2018, Yamagata, Japan; *"Review talk on  $t\bar{t} + V$  processes at the LHC"*.

February 19-23, 2018, The evaluation of the leading hadronic contribution to the muon anomalous magnetic moment, MITP Mainz, Germany; *"Expansion by region analysis for  $\mu e$  scattering"*.

December 2017, HU-DESY Zeuthen Seminar, Humboldt-Universität, Berlin, Germany, *"Associated production of a top-antitop pair with a heavy boson"*.

September 24-29, 2017, RADCOR 2017, St. Gilgen, Austria; *"Associated production of a top-antitop pair with a heavy boson at NLO+NNLL accuracy"*.

September 4-5, 2017,  $\mu e$  scattering Workshop, Padova, Italy; *"Expansion by region analysis for  $\mu e$  scattering"*.

August 27-September 1, 2017, QCD@LHC, Debrecen, Hungary; *"Associated production of a top-antitop pair with a heavy boson at NLO+NNLL accuracy"*.

July 27, 2017, Research area D day, PRISMA Cluster, Munich, Germany; *"Associated production of a top-antitop pair with a heavy boson at NLO+NNLL accuracy"*.

- September 13-16, 2016, Regularization scheme workshop, Zürich, Switzerland; *"SCET approach to regularization-scheme dependence of QCD amplitudes"*.
- May 3-6, 2016, SM@LHC 2016, Pittsburgh, USA; *"Associated production of a top pair and a SM boson beyond NLO"*.
- March 21-24, 2016, SCET Workshop 2016, DESY Hamburg, Germany; *"Associated production of a top pair and a Higgs boson beyond NLO"*.
- November 2014, Particle Physics Seminar, ETH/University of Zürich, Zürich, Switzerland, *"RG-improved predictions for the production of heavy particles at the LHC"*.
- June 18-20, 2014, LoopFest XIII, New York, USA; *"RG-improved fully differential predictions for top-pair production at hadron colliders"*.
- October 2013, New York City College of Technology, CUNY, New York, USA, *"Soft-gluon resummation for the production of supersymmetric particles at the LHC"*.
- May 2013, LTP Seminar, Paul Scherrer Institut, Switzerland; *"Stop-pair production"*.
- March 14-16, 2013, SCET 2013, Durham, USA; *"Approximate NNLO predictions for the stop-pair production cross section at the LHC"*.
- January 2013, Particle Theory Seminar, Paul Scherrer Institut, Switzerland, *"Soft-gluon resummation for the production of supersymmetric particles"*.
- July 21-27, 2011, EPS-HEP 2011, Grenoble, Rhône-Alpes, France; *"Soft-gluon resummation for slepton-pair production"*.

#### **Attended Workshops**

- February 4-8, 2019, Theory for muon-electron scattering at 10ppm, Zürich, Switzerland.
- November 5-7, 2018, Next-to-leading power corrections workshop, Amsterdam, Netherlands.
- July 24 - August 5, 2017, Automated, Resummed and Effective: Precision Computations for the LHC and Beyond, München, Germany.
- January 24-29, 2016, Next-to-leading power corrections workshop, Higgs center for theoretical physics, Edinburgh, Scotland.
- September 26-28, 2014, Topical workshop on top quark differential distributions, Cannes, France.
- March 26-28, 2014, SCET 2014, Munich, Germany.

**Attended Schools**

PSI Summer School, More than Higgs - Effective Theories for Particle Physics, Lyceum Alpinum, Zuoz, Switzerland, August 17-23, 2014.

Summer School on Symmetries, Fundamental Interactions and Cosmology 2011, Island "Frauenchiemsee", Bavaria, Germany, September 11-16, 2011.

Annual Retreat of the Graduate School Symmetry Breaking in Fundamental Interactions and the Research Center Elementary Forces and Mathematical Foundations, Bingen, Germany, September 27-29, 2010.

**Students Supervision**

2020 - 2021: Co-supervision of a master student at the University of Milano-Bicocca.

2013 - 2020: Joint supervision of four Ph.D. students: Andrea Visconti (PSI, graduated 2016), Caspar Hasner (TUM, graduated 2020), Sebastian Jaskiewicz (TUM) and Kai Urban (TUM).

2016 Summer term: supervision of a bachelor thesis at TU Munich.

**Teaching Experience**

2017 Winter term, Technical University of Munich, exercises classes of "*Quantum Field Theory*".

2016 Winter term, Technical University of Munich, exercises classes of "*Classical Electrodynamics*".

2015 Winter term, Technical University of Munich, exercises classes of "*Quantum Mechanics 2*".

2012 Summer term, Johannes Gutenberg-University Mainz, exercises classes of "*Supersymmetry*".

2011 Winter term, Johannes Gutenberg-University Mainz, exercises classes of "*Symmetries in Physics*".

2011 Summer term, Johannes Gutenberg-University Mainz, exercises classes of "*Quantum Field Theory II*".

### **Professional Activities**

Member of the “GENEVA” Monte Carlo collaboration.

Referee for the European Physical Journal C and Physical Review D.

Participation to the “LHC Higgs Cross Section Working Group”.

Organization of the “Milan joint phenomenology seminar”.

Organization of PSI/LTP Colloquia at the Paul Scherrer Institute.

### **Languages**

Mother tongue: Italian

Excellent knowledge: English

Working knowledge: German

### **Computer Skills**

Operating Systems

Linux, MacOS X: very good knowledge

Programming Languages

Fortran 90, FORM, Mathematica, ~~TeX~~ <sup>LaTeX</sup>: very good knowledge

C++, BASH: good knowledge

Version Control Systems

git, svn: good knowledge

HPC systems

Slurm, PBS: good knowledge

Software in particle physics

Reduze, LiteRed, QGRAF: very good knowledge

Cuba: good knowledge

Developer

GENEVA Monte Carlo

### **References**

Professor Dr. S. Alioli,  
University of Milano-Bicocca, Milan, Italy.  
E-mail: [simone.alioli@unimib.it](mailto:simone.alioli@unimib.it)

Professor Dr. A. Ferroglia,  
 New York City College of Technology, CUNY, New York, USA.  
 E-mail: AFerroglia@citytech.cuny.edu

Professor Dr. B. D. Pecjak,  
 Institute for Particle Physics Phenomenology,  
 University of Durham, Durham, United Kingdom.  
 E-mail: ben.pecjak@durham.ac.uk

Professor Dr. M. Neubert,  
 PRISMA Cluster of Excellence & Mainz Institute for Theoretical Physics,  
 Johannes Gutenberg-Universität, Mainz, Germany.  
 E-mail: neubertm@uni-mainz.de

Professor Dr. A. Signer,  
 Paul Scherrer Institut, Villigen PSI, Switzerland,  
 Physik-Institut, Universität Zürich, Zürich, Switzerland.  
 E-mail: adrian.signer@psi.ch

## Book

T. Becher, A. Broggio, A. Ferroglia,  
*Introduction to Soft-Collinear Effective Theory*,  
 Lecture Notes in Physics vol. 896 (2015), Springer, [arXiv:1410.1892].

## Publications and preprints

1. S. Alioli, A. Broggio, A. Gavardi, S. Kallweit, M.A. Lim, R. Nagar, D. Napoletano, *Next-to-next-to-leading order event generation for ZZ boson pair production matched to parton shower*, [arXiv:2103.01214].
2. S. Alioli, C.W. Bauer, A. Broggio, A. Gavardi, S. Kallweit, M.A. Lim, R. Nagar, D. Napoletano, L. Rottoli, *Matching NNLO to parton shower using  $N^3LL$  colour-singlet transverse momentum resummation in GENEVA*, [arXiv:2102.08390].
3. S. Alioli, A. Broggio, A. Gavardi, S. Kallweit, M.A. Lim, R. Nagar, D. Napoletano, L. Rottoli, *Precise predictions for photon pair production matched to parton showers in GENEVA*, Accepted for publication in JHEP, [arXiv:2010.10498].
4. S. Alioli, A. Broggio, A. Gavardi, S. Kallweit, M.A. Lim, R. Nagar, D. Napoletano, L. Rottoli, *Resummed predictions for hadronic Higgs boson decays*, [arXiv:2009.13533].

5. M. Beneke, A. Broggio, S. Jaskiewicz, L. Vernazza,  
*Threshold factorization of the Drell-Yan process at next-to-leading power*,  
JHEP 20 (2020) 078, [arXiv:1912.01585].
6. S. Alioli, A. Broggio, S. Kallweit, M.A. Lim, L. Rottoli,  
*Higgsstrahlung at NNLL'+NNLO Matched to Parton Showers in GENEVA*,  
Phys. Rev. D 100, 096016, [arXiv:1909.02026].
7. A. Broggio, A. Ferroglia, R. Frederix, D. Pagani, B. D. Pecjak, I. Tsinikos,  
*Top-quark pair hadroproduction in association with a heavy boson at NLO+NNLL including EW corrections*, JHEP 1908 (2019) 039, [arXiv:1907.04343].
8. M. Beneke, A. Broggio, C. Hasner, K. Urban, M. Vollmann,  
*Resummed photon spectrum from dark matter annihilation for intermediate and narrow energy resolution*, JHEP 1908 (2019) 103, [arXiv:1903.08702].
9. M. Beneke, A. Broggio, M. Garny, S. Jaskiewicz, R. Szafron, L. Vernazza, J. Wang,  
*Leading-logarithmic threshold resummation of the Drell-Yan process at next-to-leading power*, JHEP 1903 (2019) 043, [arXiv:1809.10631].
10. R. Bonciani, A. Broggio, L. Cieri, A. Ferroglia,  
*Master Integrals for double real radiation emission in heavy-to-light quark decay*, Eur.Phys.J. C 78 8 (2018) 674, [arXiv:1807.01681].
11. M. Beneke, A. Broggio, C. Hasner, M. Vollmann,  
*Energetic  $\gamma$ -rays from TeV scale dark matter annihilation resummed*, Phys.Lett. B 786 (2018) 347-354, [arXiv:1805.07367].
12. A. Broggio, A. Ferroglia, M. C. N. Fiolhais, A. Onofre,  
*Pseudoscalar couplings in  $t\bar{t}H$  production at NLO+NLL accuracy*, Phys. Rev. D 96, 073005, [arXiv:1707.01803].
13. C. Gnendiger et al.,  
*To  $d$ , or not to  $d$ : recent developments and comparisons of regularization schemes*, Eur.Phys.J. C77 (2017) no. 7, 471, [arXiv:1705.01827].
14. A. Broggio, A. Ferroglia, G. Ossola, B. D. Pecjak, R. D. Sameshima,  
*Associated production of a top pair and a Z boson at the LHC to NNLL accuracy*, JHEP 1704 (2017) 105, [arXiv:1702.00800].
15. A. Broggio, A. Ferroglia, B. D. Pecjak, L. Yang,  
*NNLL resummation for the associated production of a top pair and a Higgs boson at the LHC*, JHEP 1702 (2017) 126, [arXiv:1611.00049].
16. A. Broggio, A. Ferroglia, G. Ossola, B. D. Pecjak,  
*Associated production of a top pair and a W boson at next-to-next-to-leading logarithmic accuracy*, JHEP 1609 (2016) 089, [arXiv:1607.05303].



17. A. Broggio, A. Ferroglia, B. D. Pecjak, A. Signer, L. Yang,  
*Associated production of a top pair and a Higgs boson beyond NLO*,  
JHEP 1603 (2016) 124, [arXiv:1510.01914].
18. A. Broggio, C. Gnendiger, A. Signer, D. Stöckinger, A. Visconti,  
*SCET approach to regularization-scheme dependence of QCD amplitudes*,  
JHEP 1601 (2016) 078, [arXiv:1506.05301].
19. A. Broggio, C. Gnendiger, A. Signer, D. Stöckinger, A. Visconti,  
*Computation  $H \rightarrow gg$  in DRED and FDH: renormalization, operator mixing,  
and explicit two-loop results*, Eur.Phys.J. C75 (2015) no. 9, 418, [arXiv:1503.09103].
20. A. Broggio, A. Ferroglia, B.D. Pecjak, Z. Zhang,  
*NNLO hard functions in massless QCD*,  
JHEP 1412 (2014) 005, [arXiv:1409.5294].
21. A. Broggio, E.J. Chun, M. Passera, K.M. Patel, S.K. Vempati,  
*Limiting two-Higgs-doublet models*,  
JHEP 1411 (2014) 058, [arXiv:1409.3199].
22. A. Broggio, A.S. Papanastasiou, A. Signer,  
*Renormalization-group improved fully differential cross sections for top pair  
production*, JHEP 1410 (2014) 98, [arXiv:1407.2532].
23. A. Broggio, A. Ferroglia, M. Neubert, L. Vernazza, L. Yang,  
*NNLL Momentum-Space Resummation for Stop-Pair Production at the LHC*,  
JHEP 1403 (2014) 066, [arXiv:1312.4540].
24. A. Broggio, A. Ferroglia, M. Neubert, L. Vernazza, L. Yang,  
*Approximate NNLO Predictions for the Stop-Pair Production Cross Section  
at the LHC*, JHEP 1307 (2013) 042, [arXiv:1304.2411].
25. A. Broggio, M. Neubert, L. Vernazza,  
*Soft-gluon resummation for slepton-pair production at hadron colliders*,  
JHEP 1205 (2012) 151, [arXiv:1111.6624].

### Proceedings and Reports

1. A. Broggio, *Associated production of a top-antitop pair with a heavy boson  
at NLO+NNLL accuracy* PoS HQL2018 (2018) 020.
2. A. Broggio, *NNLL resummation for the associated production of a top pair  
with a heavy boson at the LHC*, PoS RADCOR2017 (2018) 056, [arXiv:1801.06806].
3. A. Broggio, A. Ferroglia, N. Greiner, G. Ossola,  
*Recent Developments in Higher-Order Calculations: Hard Functions at NLO  
with GoSam*, PoS EPS-HEP2017 (2017) 392, [arXiv:1711.09462].

4. LHC Higgs Cross Section Working Group, *Handbook of LHC Higgs Cross Sections: 4. Deciphering the Nature of the Higgs Sector*, [arXiv:1610.07922].
5. A. Broggio, M. Neubert, L. Vernazza, *Soft-gluon resummation for slepton-pair production*, PoS EPS-HEP2011 (2011) 269, [arXiv:1111.0864].

Data

09/03/2021

Luogo

Monza