Curriculum Vitae
Giuseppe De Laurentis

General Information

- ***Academic Email*** giuseppe.delaurentis@ed.ac.uk
- ***Personal Email*** g.dl@hotmail.it
- ***Personal Website*** gdelaurentis.github.io
- ***Skype Contact*** giuseppe_dela
- ***Nationality*** Italian
- ***Place of Birth*** Milan, Italy
- ***Date of Birth*** 16^{th} July 1993
- ***Publications I refereed*** 3
- ***H-Index/Published Papers*** 9/11
- ***Database*** inspirehep.net

Employment

- **PostDoc - Higgs Centre for Theoretical Physics - University of Edinburgh** 01/10/2023 -
  Supervisors: Einan Gardi and Mao Zeng
- **PostDoc - Paul Scherrer Institut (PSI)** 01/10/2022 - 30/09/2023
  Supervisor: Harald Ita - LTP Theory Group
- **PostDoc - Physikalisches Institut - Albert-Ludwigs-Universität Freiburg**
  Supervisor: Harald Ita - Theoretische Teilchenphysik 01/09/2020 - 30/09/2022

Higher Education

- **PhD - Institute for Particle Physics Phenomenology - Durham Uni.** 01/09/2016 - 31/08/2020
  STFC Scholarship - Supervisor: Daniel Maître - Viva: 15^{th} July 2020 - Awarded: 7^{th} Jan. 2021
- **Master Degree in Physics (MPhys) - University of Oxford** 01/10/2012 - 01/06/2016
  Theoretical and Particle Physics - First Class - Winton Capital Prize for Best 2016 MPhys Thesis
- **Selected Courses at Harvard University & Stanford University** Summer Terms 2010 - 2011
  Classical Physics (Mark: A), Calculus (Mark: A+), Introduction to Statistics (Mark: A)

Additional Education & Exams

- **GREs**: General - Percentile: 95^o (in 2 of 3 sections); Physics - Percentile 87^o 19/09/2015 & 01/10/2015
- **SATs** - Maths 2 and Physics - Both Full Marks: 800/800 2011
- **SUMaC** - Stanford University Mathematics Camp Summer 2009
- Earlier info available upon request

Publications

- **Analytic amplitudes for a pair of Higgs bosons in association with three partons**
  John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis 22/08/2024
  Journal: to be submitted - Preprint: arXiv:2408.12686 - Citations: 1
- **Double-virtual NNLO QCD corrections for five-parton scattering. II. The quark channels**
  Giuseppe De Laurentis, Harald Ita, Vasily Sotnikov 30/11/2023
  Journal: PhysRevD.109.094024 - Preprint: arXiv:2311.18752 - Citations: 26
- **Double-virtual NNLO QCD corrections for five-parton scattering. I. The gluon channel**
  Giuseppe De Laurentis, Harald Ita, Maximillian Klinkert, Vasily Sotnikov 16/11/2023
  Journal: PhysRevD.109.094023 - Preprint: arXiv:2311.10086 - Citations: 28
- **Two-loop QCD corrections for three-photon production at hadron colliders**
  Samuel Abreu, GDL, Harald Ita, Maximillian Klinkert, Ben Page, Vasily Sotnikov 26/05/2023
  Journal: SciPostPhys.15.4.157 - Preprint: arXiv:2305.17056 - Citations: 23
- **Vector boson pair production at one loop: analytic results for the process $q\bar{q}\ell\bar{\ell}\ell'\bar{\ell}'g$**
  John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis 31/03/2022
  Journal: JHEP07(2022)096 - Preprint: arXiv:2203.17170 - Citations: 12

- **Ansätze for Scattering Amplitudes from p-adic Numbers and Algebraic Geometry** 08/03/2022
  Giuseppe De Laurentis, Ben Page
  Journal: JHEP12(2022)140 - Preprint: arXiv:2203.04269 - Citations: 32
- **The pp $\to$ W($\to$ lν) + γ process at next-to-next-to-leading order** 03/05/2021
  John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis, Satyajit Seth
  Journal: JHEP07(2021)079 - Preprint: arXiv:2105.00954 - Citations: 13
- **Two-Loop Five-Parton Leading-Colour Finite Remainders in the Spinor-Helicity Formalism** 27/10/2020
  Giuseppe De Laurentis, Daniel Maître
  Journal: JHEP02(2021)016 - Preprint: arXiv:2010.14525 - Citations: 28
- **The one-loop amplitudes for Higgs + 4 partons with full mass effects** 10/02/2020
  Lucy Budge, John M. Campbell, Giuseppe De Laurentis, R. Keith Ellis, Satyajit Seth
  Journal: JHEP05(2020)079 - Preprint: arXiv:2002.04018 - Citations: 29
- **Analytical amplitudes from numerical solutions of the scattering equations** 24/10/2019
  Giuseppe De Laurentis
  Journal: JHEP02(2020)194 - Preprint: arXiv:1910.11355] - Citations: 6
- **Extracting analytical one-loop amplitudes from numerical evaluations** 08/04/2019
  Giuseppe De Laurentis, Daniel Maître
  Journal: JHEP07(2019)123 - Preprint: arXiv:1904.04067 - Citations: 38

Theses

- **Numerical techniques for analytical high-multiplicity scattering amplitudes** 14/09/2020
  Giuseppe De Laurentis - Supervisor: Daniel Maître - PhD Thesis - etheses.dur.ac.uk/13705
- **The CHY formalism for massless scattering** - CHYReview.pdf 12/04/2016
  GDL - Supervisor: Yang-Hui He - Master's Thesis - Best 2016 MPhys Thesis at Oxford (See Awards)

Awards

- **Government of Ireland Postdoctoral Fellowship** (declined) value €105,604 2023
- **Nick Brown Memorial Award at Durham University** (travel grant) 2019
- **Winton Capital Prize for the best MPhys Research Project at Oxford University** 2016

Conference Proceedings

- **Two-Loop Five-Point One-Mass Amplitudes in the Spinor-Helicity Formalism** 2024
  Giuseppe De Laurentis
  To appear in PoS ICHEP2024 - Preprint: arXiv:2409.15996 - 42nd ICHEP 2024
- **Non-Planar Two-Loop Amplitudes for Five-Parton Scattering** 2024
  Giuseppe De Laurentis
  Journal PoS LL2024 (2024) 006 - Preprint: arXiv:2406.18374 - Loops and Legs in QFT 2024
- **Lips: p-adic and singular phase space** 2023
  Giuseppe De Laurentis
  To appear in J. Phys. Conf. Ser. - Preprint: arXiv:2305.14075 - ACAT 2022
- **Constructing Compact Ansätze for Scattering Amplitudes** 2022
  Giuseppe De Laurentis, Ben Page
  Journal: PoS LL2022 (2022) 038 - Preprint: arXiv:2207.10125 - Loops and Legs in QFT 2022
- **Algebraic geometry and p-adic numbers for scattering amplitude ansätze** 2022
  Giuseppe De Laurentis
  Journal: J.Phys.Conf.Ser. 2438 (2023) - ACAT 2021

Conference Talks

- **ICHEP** - Prague, CZ - indico link 07/2024
  Two-Loop Five-Point Amplitudes in the Spinor Helicity Formalism
- **Loops and Legs in QFT** - Wittenberg, DE - indico link 04/2024
  Non-Planar Two-Loop Amplitudes for Five-Parton Scattering
- **QCD Meets EW** - CERN, CH - indico link 02/2024
  Calculation of multileg QCD amplitudes
- **MathemAmplitudes** - Padova, IT - indico link 09/2023
  Mathematical and Physical Structures of Rational Functions in Scattering Amplitudes
- **Loopfest** - SLAC, USA - indico link 06/2023
  Non-planar two-loop QCD corrections to $q\bar{q} \to \gamma\gamma\gamma$: finite remainders in the spinor-helicity formalism
- **ACAT** - Bari, IT - indico link 10/2022
  Singular and p-adic phase space: a phase space generator for theory computations
- **High Precision for Hard Processes** - Newcastle, UK - indico link 09/2022
  Non-planar two-loop corrections to $q\bar{q} \to \gamma\gamma\gamma$: finite remainders in the spinor-helicity formalism
- **Loops and Legs in QFT 2022** - Ettal, DE - indico link 05/2022
  Scattering amplitude ansätze from algebraic geometry and p-adic numbers
- **ACAT 2021** - Daejeon, SK (remote) - indico link 11/2021
  Algebraic geometry and p-adic Nnmbers for amplitude ansätze
- **QCD@LHC 2019** - Buffalo, NY - indico link 07/2019
  Analytical amplitudes from numerical evaluations
- **YETI 2019** - Durham, UK - indico link 01/2019
  Numerical to analytical amplitudes

Teaching Experience

- **Senior Teaching Assistant - Theoretische Physik I & II, Advanced QM, QFT I** 2020 - 2022
  Albert-Ludwigs-Universität Freiburg - Physikalisches Institut
- **Teaching Assistant - Mathematical Workshop & Foundations of Physics 3A** 2016 - 2020
  Durham University - Department of Physics

Organisational Experience

- **PPT Seminars** - Edinburgh, UK - organizer - weekly - calendar link 09/2023 -
- **QCD meets Gravity** - Zurich, CH - local organisation - conference - indico link 12/2022
- **YTF 11 & YTF 12** - organising committee - conferences - indico link 1 and link 2 2019 & 2020
- **Computing club** - Durham, UK - organiser - weekly informal seminars 2017 - 2020

Physics Schools Attended

- **QCD Master Class** 06/2019
  Saint-Jacut-de-la-Mer - France
- **MITP 2018 Summer School** 07/2018 - 08/2018
  Mainz Institute for Theoretical Physics - Germany
- **BUSSTEPP** - 47th British Universities Summer School in Theoretical Elementary Particle Physics
  University College London - United Kingdom 08/2017 - 09/2017
- **Amplitudes 2017 Summer School** 07/2017
  University of Edinburgh - Higgs Centre for Theoretical Physics - United Kingdom

Industry Experience

- **Programmer for hepdata.net** Spring 2020
  I worked on the hepdata.net API, entry submission and its interface to arxiv.org.
- **Internship at Mecaer Aviation Group** Summer 2013
  I assisted a senior engineer to modify a valve and I wrote reports on experiments made to assess the durability and reliability of a servo-control model (it transmits the cloche signal to the helicopter blades).

Open Source Software

The following software is freely available at `github.com/GDeLaurentis` and at `pypi.org`.

- `lips` PyPI downloads 287/month - phase-space generation w/ complex numbers, finite fields, p-adic numbers; singular-limit manipulation; spinor-helicity computation facilities; algebro-geometric tools (ideals and varieties);
- `pyadic` PyPI downloads 359/month - implementation of p-adic numbers, finite fields and related algorithms in `Python`;
- `syngular` PyPI downloads 311/month - an object-oriented Python interface to the algebraic geometry code `Singular`;
- `seampy` PyPI downloads 16/month - arbitrary-precision numerical solutions of the scattering equations in the CHY formalism and computation of tree-level amplitudes in a variety of theories.

The following software is still private, but I might make it publicly available in the near future.

- `linac` - Linear Algebra w/ `CUDA`, a high-performance library for general-purpose graphics-processing units;
- `antares` - Automated Numerical To Analytical Rational function Extraction for Scattering amplitudes.
- `antares-results` - A list of computed amplitudes in both human and computer readable format (WIP).

Skills

- **Python, C/C++, CUDA, LaTeX, Mathematica, Office, Origin, TurboPascal, AutoIt**
- **Driving licence** - Patente B - Cars and small motorbikes
- **Italian** - Mother tongue ○ **English** - Bilingual ○ **French & German** - Elementary

Academic Interests

- **Fixed order scattering amplitude computations, e.g. via on-shell methods;**
- **Mathematical structure of scattering amplitudes (zeros, poles, branch cuts);**
- **Number-theoretic and algebro-geometric methods for quantum field theory computations;**
- **Precision Standard Model phenomenological prediction;**
- **Hardware acceleration for precision particle physics.**

Further Interests

- **Computer science & gaming** - As a teenager, I have assembled my own high-performance desktop and programmed an AI able to play an international browser game autonomously.
- **Traveling** ○ **History** ○ **Science fiction** ○ **Jigsaw puzzles** ○ **Bonsai's & Aquascaping**