# Marzia Bordone

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## Personal data

- **Place of Birth**: Chiavari, Italy
- **Date of Birth**: 02/05/1989
- **Nationality**: Italian
- **spoken Languages**: italian (mother tongue), english (fluent), german (average), french (average), spanish (basic)

## Education

- **Italian Scientific Habilitation for Associate Professor in the field: Theoretical Physics of Fundamental Interactions**: awarded by IOtalian Ministry of University and Research on 03/10/2022
- **Attainment of title: Doktorin der Naturwissenschaften, Dr. sc. nat.**: awarded by Universität Zürich on the 31/10/2018
- **Master degree in Physics**: awarded by University of Genoa on the 17/07/2014
- **Bachelor degree in Physics**: awarded by University of Genoa on the 30/04/2012

## Current and previous positions

- **Senior Research Fellow at CERN (Switzerland)**: from 01/01/2022 - ongoing
- **Post doctoral researcher at University of Turin (Italy)**: from 01/10/2020 to 31/12/2021
- **Post doctoral researcher at Universität Siegen (Germany)**: from 01/10/2018 to 30/09/2020
- **Post doctoral researcher at Universität Zürich (Switzerland)**: from 01/07/2018 to 30/09/2018

## Teaching

- **Lecturer at YETI school 2023: Almost Everything About Flavour**: 01-03/08/2023, Durham, UK
- **Lecture on new physics in semileptonic B meson decays for LHCb Germany**: 07/04/2021, at Neckarzimmern
- **Lecture on rare decays for LHCb students**: 11/12/2019, at CERN
- **Quantum Field Theory 1**: tutorials for master degree students, winter semester 2017
- **Quantum Field Theory**: tutorials for master degree students in experimental physics, spring semester 2017
- **Physics 1**: tutorials for bachelor degree students, winter semester 2016
- **Mathematical Methods for Physics 2**: tutorials for bachelor degree students, spring semester 2016
- **Laboratory**: laboratory assistant for bachelor degree students, winter semester 2015
- **Laboratory**: laboratory assistant for bachelor degree students, spring semester 2015

## Talks at international conferences and workshops

- **Belle II Physics Week**: 30/10/2023-03/11/2023, KEK, Japan, title: "Challenges for a global inclusive analysis'
- **Brookhaven Forum 2023: Advancing Searches for New Physics**: 04-06/10/2023, online, title: "Recent Advances in flavour physics"
- **New Frontiers in Theoretical Physics**: 27-29/05/2023, Cortona, Italy, title: "Flavour Physics: status and prospects"
- **12th International Workshop on the CKM Unitarity Triangle (CKM 2023)**: 18-22/08/2023, Santiago de Compostela, Spain, title: "Flavour Physics: status and prospects"
- **New Frontiers in Lepton Flavour**: 15-17/05/2023, Pisa, Italy, title: "Theory of charged current decays"
- **KEK Flavour Factories workshop**: 09-10/02/2023, KEK, Tsukuba, Japan, title: "Theoretical overview of the $R_{D^{(*)}}$ anomaly and its related topics"
- **QCD@LHC 2022**: 29/11/2022-02/12/2022, Orsay, France, title: "Flavour Anomalies"
- **Status and prospects on non-leptonic B meson decays**: 31/05/2022 - 02/06/2022, Siegen and online, title: "Collider bounds on BSM effects in non-leptonic B decays"
- **10th Edition of the Large Hadron Collider Physics Conference**: 16-20/05/2022, online, title: "New ideas for Rare decays"
- **Challenges in Semileptonic B decays**: 19-23/04/2022, Barolo, Italy, title: "Inclusive $V_{cb}$ determination"
- **Flavour Anomaly Workshop 2021**: 20/10/2021, at CERN, title: " Theory overview of semileptonic decays"

- **107esimo congresso nazionale della Società Italiana di Fisica**: 13-17/10/2021, online workshop, title: "Theoretical aspects of flavour physics"
- **The XV International Conference on Heavy Quarks and Leptons - HQL 2021**: 13-17/10/2021, Warwick and online, title: "Theory overview of rare decays"
- **The 2021 CERN-CKC Theory Workshop: BSM physics towards the end of the pandemic**: 08-11/06/2021 (online workshop), title: "Model building for flavour anomalies"
- **Implications of LHCb measurements and future prospects 2020**: 19-21/10/2020 (online workshop), title: "Status and prospects of form factors for charged-current decays"
- **GDR-InF annual workshop** : 28/09/2020 (online workshop), title: "Recent developments in rare and semileptonic B meson decays"
- **Cortona Young**: 27-29/05/2020 (online workshop), title: "$B \to D^{(*)}$ form factors and $V_{cb}$ extraction"
- **13th Annual Meeting of the Helmholtz Alliance "Physics at the Terascale"**: 25-27/11/2019, DESY, title: "$B \to D^{(*)}$ form factors and $V_{cb}$ determination"
- **Hadronic Contributions to New Physics 2019**: 23-28/09/2019, Puerto de la Cruz, Spain, title: "An EFT framework combined with a FN like power counting for flavour and B anomalies"
- **European Physical Society Conference on High Energy Physics (EPS-HEP 2019)**: 10-17/07/2019, Ghent, Belgium, title: "Towards the ultimate precision in $b \to c$ exclusive matrix elements"
- **GDR-InF workshop: QED corrections to (semi-)leptonic B decays**: 08-09/07/2019, Paris, France, title: "On the QED effects on $R_K$ and $R_{K^*}$"
- **Towards the Ultimate Precision in Flavour Physics**: 2-4/04/2019, at IPPP, Durham, title: "Flavour anomalies and model building"
- **LHCb and Belle II Opportunities for Model Builders**: 28/02/2019-01/02/2019 at MITP, Mainz, title: "Towards the ultimate precision in $b \to c$ exclusive matrix elements"
- **10th International Workshop on the CKM Unitarity Triangle**: 17-21/09/2018, Heidelberg, Germany, title: "Connecting $K \to \pi\nu\bar{\nu}$ and rare $B$ anomalies"
- **XXIV Cracow Epiphany Conference on Advances in Heavy Flavour Physics**: 9-12/01/2018, Cracow, Poland, title: "A three-site gauge model for flavor hierarchies and flavor anomalies"
- **2nd LHCb open semitauonic workshop**: 13-15/11/2017, Orsay, France, title: "Lepton Flavour Universality Violation in $\Lambda_b \to \Lambda_c^* \tau \bar{\nu}_\tau$ decay"
- **Instant workshop on $B$ physics anomalies**: 17-19/05/2017, at CERN, title: "On the QED effects on $R_K$ and $R_{K^*}$"
- **XVI Incontri di Fisica delle Alte Energie**: 19-21/04/2017, Trieste, Italy, title: "Le anomalie del B in teorie effettive"
- **9th International Workshop on the CKM Unitarity Triangle**: 28/11/2016-03/12/2015, Mumbai, India, title: "On the theory prediction of $R_K$ and $R_{K^*}$"
- **Implications of LHCb measurements and future prospects 2016**: 12-14/10/2016, at CERN, title: "On precise predictions for LFU ratios in $B$ physics"
- **XV Incontri di Fisica delle Alte Energie**: 30/03/2016-01/04/2016, Genova, Italy, title: "Impatto dei decadimenti leptonici del $\tau$ sulla distribuzione $\bar{B} \to D\mu\bar{\nu}$"
- **DPG Spring Meeting 2016**: 29/02/2016-04/03/2016, Hamburg, Germany, title: "Impact of leptonic $\tau$ decays on the $\bar{B} \to D\mu\bar{\nu}$ angular distribution"

## Seminars

- **Sidney Particle physics and cosmology groups - online (01/09/2022)**: "The $V_{cb}$ puzzle"
- **University of Pisa (16/06/2022)**: "The $V_{cb}$ puzzle"
- **BSM Forum - CERN (05/05/2022)**: "The $V_{cb}$ puzzle"
- **University of Padova (24/11/2021)**: "Flavour physics: where do we stand?"
- **Cambridge (24/06/2021)**: "A puzzle in $\bar{B}_{(s)} \to D_{(s)}^{+*}\{\pi, K\}$ decays: is it New Physics?"
- **Nikhef (08/04/2021)**: "Flavour physics: from Standard Model predictions to a model building perspective"
- **Laboratoire Charles Coulomb, Montpellier (18/02/2021)**: "Flavour physics: from Standard Model predictions to a model building perspective"
- **University of Turin (21/05/2020)**: "Flavour physics: from Standard Model predictions to a model building perspective"
- **IJCLab (12/02/2020)**: "Flavour physics: from Standard Model predictions to a model building perspective"
- **Queen Mary University of London (14/11/2019)**: "Flavour anomalies: a model building perspective"
- **University of Genoa (19/12/2018)**: "B anomalies: the $PS^3$ solution"
- **Technische Universität Dortmund (29/11/2018)**: "B anomalies: the $PS^3$ solution"
- **Universität Siegen (09/07/2018)**: "Shedding light on $B$ anomalies: from Standard Model predictions to a model building perspective"

## Co-supervision of students

**Master Students:**

- Sokratis Trifinopoulos (Official supervisor: Prof. Gino Isidori)

**Ph.D. Students:**

- Claudia Cornella (Official supervisor: Prof. Gino Isidori)
- Mario Fernández Navarro (Official supervisor: Prof. S. King)
- Nico Gubernari (Official supervisor: Dr. Danny van Dyk)
- Sandro Mächler (Official supervisors: Prof. Paolo Gambino e Prof. Gino Isidori)
- Arianna Tinari (Official supervisor: Prof. Gino Isidori)

## Other responsibilities and Awards

- **CNRS Concours 2021**: ranked first for the CNRS Concours for CR2 in Section 02
- **Convener**: **EPS-HEP 2023** (Hamburg), **SM@LHC 2022** (CERN), **Implications of LHCb measurements and future prospects 2019** (CERN), **$b \to s\ell\ell$ 2019** (Lyon), **IFAE 2019** (Napols)
- **Visiting Periods**: Excellence Cluster ORIGIN, Garching, Germany (6-17/07/2020), Excellence Cluster Universe, Garching, Germany (16-27/07/2018), Fermilab Theory Visitor (03/07/2017-02/09/2017)
- **Organizational roles** : Organiser of the TH-Institute **Flavour@TH 2023** (CERN), Organiser of the Collider Cross Talks at CERN (2023 - ongoing), Organiser of the seminars for the theoretical particle physics group in Siegen (Autumn 2019, Spring 2020), Organiser of the seminars for the Center of Particle Physics ast Siegen (CPPS) (Spring 2020), Representative of post docs for the Physics Department at University of Turin (2021).
- **Referee**: Physical Review Letters, European Physics Journal C, Nuclear Physics Section B, Journal of High Energy Physics, Physica Scripta

## List of preprints

1. M. Bordone, G. Isidori, S. Mächler, A. Tinari, *Short- vs. long-distance physics in $B \to K^{(*)}\ell^+\ell^-$: a data-driven analysis*, [arxiv:2401.18007[hep-ph]]
2. J. de Blas et al, *Focus topics for the ECFA study on Higgs / Top / EW factories*, [arxiv:2401.07564[hep-ph]]
3. G. Anzivino et al, *Workshop summary – Kaons@CERN 2023*, [arxiv:2311.02923[hep-ph]]

## List of publications

1. D. Bigi, M. Bordone, P. Gambino, U. Haisch, A. Piccione, *QED effects in inclusive semi-leptonic $B$ decays*, **JHEP 11 (2023) 163**, [arxiv:2309.02849[hep-ph]]
2. M. Bordone, M. Fernández Navarro, *$\tau_{B_s}/\tau_{B_d}$ and $\Delta\Gamma_s$ confront new physics in $b \to s\tau\tau$*, **EPJC 83 (2023) 9, 842**, [arxiv:2307.07013[hep-ph]]
3. M. Bordone, A. Khodjamirian, Th. Mannel, *New sum rules for the $B_c \to J/\psi$ form factors*, **JHEP 01 (2023) 032**, [arxiv:2209.08851[hep-ph]]
4. Y. Amhis, M. Bordone, M. Reboud, *Dispersive analysis of $\Lambda_b \to \Lambda(1520)$ local form factors*, **JHEP 02 (2023) 010**, [arxiv:2208.08937[hep-ph]]
5. M. Bordone, P. Gambino, *The semileptonic $B_s$ and $\Lambda_b$ width*, **PoS CKM2021 (2023) 055**, [arxiv:2203.13197[hep-ph]]
6. D. van Dyk et al., *EOS - A Software for Flavor Physics Phenomenology*, **Eur.Phys.J.C 82 (2022) 6, 569**, [arxiv:2111.15428[hep-ph]]
7. M. Bordone, B. Capdevila, P. Gambino, *Three loop calculations and inclusive $V_{cb}$*, **Phys.Lett.B 822 (2021) 136679**, [arxiv:2107.00604[hep-ph]]
8. M. Bordone, M. Rahimi, K. K. Vos, *Lepton flavour violation in rare $\Lambda_b$ decays*, **Eur.Phys.J.C 81 (2021) 8, 756**, [arxiv:2106.05192[hep-ph]]
9. C. Bobeth, M. Bordone, N. Gubernari, M. Jung, D. van Dyk, *Lepton-flavour non-universality of $\bar{B} \to D^*\ell\bar{\nu}$ angular distributions in and beyond the Standard Model*, **Eur.Phys.J.C 81 (2021) 11, 984**, [arxiv:2104.02094[hep-ph]]

10. M. Bordone, A. Greljo, D. Marzocca, *Exploiting dijet resonance searches for flavor physics*, **JHEP 08 (2021) 036**, [arxiv:2103.10332[hep-ph]]

11. M. Bordone, *Heavy quark expansion of* $\Lambda_b \to \Lambda^*$ *form factors beyond leading order*, **Symmetry 13 (2021) 4, 531**, [arxiv:2101.12028[hep-ph]]

12. M. Bordone, C.Cornella, G.Isidori, M.König, *The LFU Ratio* $R_\pi$ *in the Standard Model and Beyond*, **Eur.Phys.J.C 81 (2021) 9, 850** [arxiv:2101.11626[hep-ph]]

13. M. Bordone, O. Cata, T. Feldmann, R. Mandal, *Constraining flavour patterns of scalar leptoquarks in the effective field theory*, **JHEP 03 (2021) 122**, [arxiv:2010.03297[hep-ph]]

14. M.Bordone, N. Gubernari, T. Huber, M. Jung, D. van Dyk, *A puzzle in* $\bar{B}^0_{(s)} \to D^{(*)+}_{(s)}\{\pi^-, K^-\}$ *decays and extraction of the* $f_s/f_d$ *fragmentation fraction*, **Eur.Phys.J.C 80 (2020) 10, 951**, [arxiv:2007.10338[hep-ph]]

15. M.Bordone, N. Gubernari, M. Jung, D. van Dyk, *Heavy-Quark Expansion for* $\bar{B}_s \to D_s^{(*)}$ *Form Factors and Unitarity Bounds beyond the* $SU(3)_F$ *Limit*, **Eur.Phys.J. C80 (2020) no.4, 437**, [arxiv:1912.09335[hep-ph]]

16. M. Bordone, O. Cata, T. Feldmann, *Effective Theory Approach to New Physics with Flavour: General Framework and a Leptoquark Example*, **JHEP 01 (2020) 067**, [arxiv:1910.02641[hep-ph]]

17. M. Bordone, M. Jung, D. van Dyk, *Theory determination of* $\bar{B} \to D^{(*)}\ell^-\bar{\nu}$ *form factors at* $\mathcal{O}(1/m_c^2)$, **Eur.Phys.J. C80 (2020) no.2, 74**, [arxiv:1908.09398[hep-ph]]

18. M. Bordone, C. Cornella, J. Fuentes-Martín, G. Isidori, *Low-energy signatures of the* PS$^3$ *model: from B-physics anomalies to LFV* , **JHEP 1810 (2018) 148**, [arxiv:1805.09328[hep-ph]]

19. P. Böer, M. Bordone, E. Graverini, P. Owen, M. Rotondo, D.van Dyk, *Testing lepton flavour universality in semileptonic* $\Lambda_b \to \Lambda_c^*$ *decays*, **JHEP 1806 (2018) 155**, [arxiv:1801.08367 [hep-ph]]

20. M. Bordone, C. Cornella, J. Fuentes-Martín, G. Isidori, *A three-site gauge model for flavor hierarchies and flavor anomalies*, **Phys.Lett. B779 (2018) 317-323**, [arxiv:1712.01368[hep-ph]]

21. M. Bordone, D. Buttazzo, G. Isidori, J. Monnard, *Probing Lepton flavour universality with* $K \to \pi\nu\bar{\nu}$ *decays*, **Eur.Phys.J. C77 (2017) no.9, 618**, [arxiv:1705.10729[hep-ph]]

22. M. Bordone, G. Isidori, S. Trifinopoulus, *Semi-leptonic B-physics anomalies: a general EFT anlysis within the* $U(2)^n$ *flavor symmetry*, **Phys.Rev. D96 (2017) no.1, 015038**, [arxiv:1702.07238[hep-ph]]

23. C. Biggio, M. Bordone, L. Di Luzio and G. Ridolfi, *Massive vectors and loop observables: the* $g-2$ *case*, **JHEP 1610 (2016) 002**, [arXiv:1607.07621[hep-ph]]

24. M. Bordone, G. Isidori, A. Pattori, *On the Standard Model predictions for* $R_K$ *and* $R_{K^*}$, **Eur.Phys.J. C76 (2016) no.8, 440**, [arXiv:1605.07633[hep-ph]]

25. M. Bordone, G. Isidori, D. van Dyk, *Impact of leptonic* $\tau$ *decays on the distribution of* $B \to P\mu\bar{\nu}$ *decays*, **Eur.Phys.J. C76 (2016) no.7, 360**, [arXiv:1602.06143[hep-ph]]

26. M. Bordone, A. Greljo, G. Isidori, M.Marzocca, A.Pattori, *Higgs Pseudo Observables and Radiative Corrections*, **Eur.Phy.J. C75 (2015) no.8, 385**, [arXiv:1507.02555[hep-ph]]

27. C. Biggio and M. Bordone, *Minimal muon magnetic moment*, **JHEP 1502(2015) 099**, [arXiv:1411.6799[hep-ph]]