

# Ayan Paul

FELLOW @ DESY, HAMBURG & SENIOR SCIENTIST @ HUMBOLDT UNIVERSITÄT ZU BERLIN

Institut für Physik, Humboldt Universität zu Berlin, Notkestraße 15, 12489 Berlin, Germany.

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## Research Expertise

- *Charm dynamics*: CP violation, hadronic decays, final state interactions, leptonic and semileptonic decays.
- *Beauty dynamics*: Semileptonic and leptonic decays, decay distributions, tests of lepton flavour universality and BSM
- *Higgs and EW Physics*: Effective Field Theories, Higgs productions and decays, BSM and future colliders
- *Physics Computation*: Active developer for the statistical core (MCMC based Bayesian Analysis) and flavour physics in **HEPfit**
- *Liaison with Experiments*: Contributor to B2TiP and associate member of the former Consorzio Laboratorio Nicola Cabibbo
- *Mathematical Epidemiology*: Modeling of COVID-19 disease spread, mitigation and exit strategies.

## Academic Appointments

### Deutsches Elektronen-Synchrotron (DESY)

Hamburg, Germany

FELLOW

November 2017 - PRESENT

Delegated as *Senior Scientist* to the Humboldt Universität zu Berlin.

### Istituto Nazionale di Fisica Nucleare, Sezione di Roma I

Roma, Italy

POSTDOCTORAL FELLOW

September 2012 - October 2017

ERC Grant “NPFlavour”.

### University of Notre Dame du Lac

Notre Dame IN, USA

TEACHING ASSISTANT

August 2005 - December 2011

Employed full-time by the Department of Physics.

## Education

### University of Notre Dame du Lac, Department of Physics

Notre Dame, Indiana

PHD IN PHYSICS

2007 - 2012

Title of dissertation: *Charm Beyond the Standard Model*

PhD Advisor: *Prof. Ikaros I. Bigi*

### University of Notre Dame du Lac, Department of Physics

Notre Dame, Indiana

MS IN PHYSICS

2005 - 2007

### S. N. Bose National Center for Basic Sciences

Calcutta, India

M.Sc. IN PHYSICS

2003 - 2005

### Presidency College, University of Calcutta

Calcutta, India

B.Sc. IN PHYSICS

1999 - 2002

## Grants & Awards

2020	<b>DESY Strategy Fund for COVID-19 (100,000€)</b> , Deutsches Elektronen-Synchrotron	Hamburg, Germany
2020	<b>Corona Crisis and Beyond (under review, 120,000€)</b> , Volkswagen Stiftung	Germany
2012	<b>GPS Conference 2012 Sponsorships</b> , Dept. of Physics & Graduate School, University of Notre Dame du Lac	Notre Dame, IN USA
2012	<b>Research and Dissertation Award</b> , Dept. of Physics, University of Notre Dame du Lac	Notre Dame, IN USA
2011	<b>Notebaert Prof. Dev. Fund (II)</b> , Graduate School, University of Notre Dame du Lac	Notre Dame, IN USA
2011	<b>Notebaert Prof. Dev. Fund (I)</b> , Graduate School, University of Notre Dame du Lac	Notre Dame, IN USA
2011	<b>Joseph F. Downes Memorial Award</b> , Graduate School, University of Notre Dame du Lac	Notre Dame, IN USA
2010	<b>W. &amp; L. Stavropoulos Fellowship</b> , Graduate School, University of Notre Dame du Lac	Notre Dame, IN USA
2010	<b>Kaneb Outstanding Graduate Teaching Assistant Award</b> , Kaneb Center, University of Notre Dame du Lac	Notre Dame, IN USA
2009	<b>Reilly Fellowship</b> , Graduate School, University of Notre Dame du Lac	Notre Dame, IN USA
2005	<b>CSIR Junior Research Fellowship</b> , Center for Scientific and Industrial Research (HRDG, Govt. of India)	Calcutta, India
2005	<b>University Lecturership</b> , National Eligibility Test (UGC–CSIR, Govt. of India)	Calcutta, India
2003 – 2005	<b>Research Fellowship</b> , S. N. Bose National Center for Basic Sciences	Calcutta, India

## Computational Skills and Experience

<b>Programming Languages</b>	FORTTRAN, C, C++ (Primary language for HEPfit), Python, Perl, shell scripting, Java Script
<b>Parallel Computing</b>	MPI and OpenMP (Used in HEPfit and BAT)
<b>HEP Tools</b>	MadGraph, FormCalc, FeynRules, FeynCalc, FeynArts, FeynHiggs, LoopTools, MCFM and several other public codes used in HEP
<b>Libraries &amp; Packages</b>	ROOT, GSL, BOOST, BAT (Used in HEPfit), TensorFlow, XGBoost, scikit-learn etc.
<b>Functional Programming</b>	Mathematica, MatLab, form and R
<b>Analytic Methods</b>	Bayesian Analysis, Markov Chain Monte Carlo, Statistical Inference, Multivariate Methods, Neural Networks and Machine Learning.
<b>Code Moderation</b>	Moderator for the core of the HEPfit code (statistical framework and the user interface.)
<b>Flavour@HEPfit</b>	Implemented flavour observables from all flavour sectors in HEPfit
<b>Complex Networks</b>	Network construction and analysis of the authors' collaboration network of all publications in Physical Review C during 2000 – 2006 with an aim to enhance inter-disciplinary and inter-institutional collaborations and for use in reports and proposals submitted to national funding agencies. (Project funded by JINA in 2017)

Github repository for HEPfit: <https://github.com/silvest/HEPfit>.  
My contributions to HEPfit and other codes: <https://github.com/talismanbrandi>.

## Publications

Authors are always listed alphabetically arranged by their last name in Particle Physics papers with very rare exceptions.

### COVID-19:

1. H. Kim and A. Paul, *Contact Tracing: a game of big numbers in the time of COVID-19*, medRxiv DOI:10.1101/2020.04.22.20071043v1. Submitted for review.
2. A. Paul, P Englert and M. Varga, *Socio-economic disparities and COVID-19 in the USA*, arXiv:2009.04935. Submitted for review.
3. J. Bell et al., *Beyond COVID-19: Network science and sustainable exit strategies*, arXiv:2009.12968. Submitted for review.

### Flavour Physics:

1. L. Alasfar, A. Azatov, J. de Blas, A. Paul, M. Valli, *B anomalies under the lens of electroweak precision*, arXiv:2007.04400. Submitted for review. (1 citation)
2. M. Ciuchini, A. Coutinho, M. Fedele, E. Franco, A. Paul, L. Silvestrini and M. Valli, *New Physics in  $b \rightarrow s \ell^+ \ell^-$  confronts new data on Lepton Universality*, Eur. Phys. J. **C79** (2019) no.8, 719. [arXiv:1903.09632]. (105 citations)
3. F. Buccella, A. Paul and P. Santorelli,  *$SU(3)_F$  breaking through FSI phases and CP asymmetries in  $D \rightarrow PP$  decays*, Phys. Rev. **D 99** (2019) no.11, 113001. [arXiv:1902.05564]. (14 citations)
4. M. Ciuchini, A. Coutinho, M. Fedele, E. Franco, A. Paul, L. Silvestrini and M. Valli, *Hadronic uncertainties in the  $B \rightarrow K^* \ell^+ \ell^-$  decays*, Proceedings of the International Conference on B-Physics at Frontier Machines, BEAUTY 2018. PoS **BEAUTY2018** (2018) 044. [arXiv:1809.03789]. (6 citations)
5. Belle II Collaboration (E. Kou (ed.) et. al.), *The Belle II Physics Book*, PTEP 2019 (2019) 12, 123C01. [arXiv:1808.10567]. (474 citations)
6. M. Ciuchini, A. Coutinho, M. Fedele, E. Franco, A. Paul, L. Silvestrini and M. Valli, *On Hadronic uncertainties polluting the New Physics hunt in  $b \rightarrow s$  transitions*, Proceedings of the 7<sup>th</sup> Workshop on Theory, Phenomenology and Experiments in Flavour Physics: The Future of BSM Physics. Nucl. Part. Phys. Proc. **303-305** (2018) 8-13. [inspirehep link]. (1 citation)
7. M. Ciuchini, M. Fedele, E. Franco, S. Mishima, A. Paul, L. Silvestrini and M. Valli, *Knowns and Unknowns in the Predictions for  $B \rightarrow K^* \ell^+ \ell^-$* , Proceedings of the 6<sup>th</sup> Workshop on Theory, Phenomenology and Experiments in Flavour Physics: Interplay of Flavour Physics with electroweak symmetry breaking. Nucl. Part. Phys. Proc. **285-286** (2017) 45-49. [inspirehep link]. (6 citations)
8. M. Ciuchini, A. Coutinho, M. Fedele, E. Franco, A. Paul, L. Silvestrini and M. Valli, *On Flavourful Easter eggs for New Physics hunger and Lepton Flavour Universality violation*, Eur. Phys. J. **C77** (2017) no.10, 688. [arXiv:1704.05447]. (6 citations)
9. G. Casarosa, A. Di Canto and A. Paul, *Phenomenological and Experimental Developments in Charm Physics: The WG7 Report from CKM 2016*, PoS **CKM2016** (2017) 020. [arXiv:1704.00041]. (210 citations)
10. M. Ciuchini, M. Fedele, E. Franco, S. Mishima, A. Paul, L. Silvestrini and M. Valli,  *$B \rightarrow K^* \ell^+ \ell^-$  in the Standard Model: Elaborations and Interpretations*, PoS **ICHEP2016** (2016) 584. [arXiv:1611.04338]. (24 citations)
11. A. Paul and D. Straub, *Constraints on new physics from radiative B decays*, JHEP **04** (2017) 027. [arXiv:1608.02556.] (58 citations)

12. M. Ciuchini, M. Fedele, E. Franco, S. Mishima, A. Paul, L. Silvestrini and M. Valli,  $B \rightarrow K^* \ell^+ \ell^-$  decays at large recoil in the Standard Model: a theoretical reappraisal. JHEP06 (2016) 116. [arXiv:1512.07157]. (179 citations)
13. A. Paul, *Lessons from charm dynamics*. Proceedings of **XII IFAE**, Cittadella Universitaria di Monserrato, Cagliari. 3rd - 5th April 2013. Il Nuo. Cim. **C 37** N. 1. [arXiv:1308.5886]. (0 citation)
14. A. Paul, A. de La Puente and I. I. Bigi, *Manifestations of Warped Extra Dimension in Rare Charm Decays and Asymmetries*. Phys. Rev. **D 90** (2014) 014035. [arXiv:1212.4849]. (25 citations)
15. I. I. Bigi and A. Paul, *On CP Asymmetries in Two-, Three- and Four-Body D Decays*. JHEP03 (2012) 021. [arXiv:1110.2862]. (41 citations)
16. I. I. Bigi, A. Paul and S. Recksiegel, *Theoretical Conclusions from CDF Analyses of CP Violation in  $D^0 \rightarrow \pi^+ \pi^-$ ,  $K^+ K^-$  and Future Tasks*. JHEP06 (2011) 089. [arXiv:1103.5785]. (53 citations)
17. A. Paul, I. I. Bigi and S. Recksiegel, *On  $D \rightarrow X_u \ell^+ \ell^-$  within the Standard Model and Frameworks like the littlest Higgs model with T Parity*. Phys. Rev. **D 83** (2011) 114006. [arXiv:1101.6053]. (60 citations)
18. A. Paul, I. I. Bigi and S. Recksiegel,  *$D^0 \rightarrow \gamma\gamma$  and  $D^0 \rightarrow \mu^+ \mu^-$  rates on an unlikely impact of the littlest Higgs model with T parity*. Phys. Rev. **D 82** (2010) 094006. [arXiv:1008.3141]. (39 citations)

### Higgs and Electroweak Physics:

1. J. De Blas, G. Durieux, C. Grojean, J. Gu and A. Paul, *On the future of Higgs, electroweak and diboson measurements at lepton colliders*. JHEP12 (2019) 117. [arXiv:1907.04311]. (17 citations)
2. J. de Blas et. al., *CLIC Potential for New Physics*. CERN Yellow Rep. Monogr. Vol. 3 (2018). [arXiv:1812.02093]. (76 citations)
3. S. Gori, C. Grojean, A. Juste, A. Paul, *Heavy Higgs Searches: Flavor Matters*. JHEP01 (2018) 108. [arXiv:1710.03752]. (17 citations)
4. A. Azatov, C. Grojean, A. Paul and E. Salvioni, *Resolving gluon fusion loops at current and future hadron colliders*. JHEP09 (2016) 123. [arXiv:1608.00977]. (39 citations)
5. A. Azatov, C. Grojean, A. Paul and E. Salvioni, *Taming the off-shell Higgs boson*. J. Exp. Theor. Phys. 120 (2015). [arXiv:1406.6338]. (83 citations)
6. A. Azatov and A. Paul, *Probing Higgs couplings with high  $p_T$  Higgs production*. JHEP01 (2014) 014. [arXiv:1309.5273]. (98 citations)

### Computation for Physics:

1. J. de Blas et. al., *HEPfit: a Code for the Combination of Indirect and Direct Constraints on High Energy Physics Models*. Eur. Phys. J. **C80** (2020) no.5, 456. [arXiv:1910.14012].

## Teaching & Mentoring

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### SCHOOL LECTURES

September 2019 **Berlin QFT Master Class**, Electroweak Symmetry Breaking.

### THESIS SUPERVISION

- 2015 **Claudio Fabiani**, MS Thesis, Università di Roma La Sapienza.  
*The decays of  $B_{s,d}$  in the Standard Model*.
- 2014 **Marco Fedele**, MS Thesis, Università di Roma La Sapienza.  
*Study of the  $B \rightarrow K^{(*)} \ell^+ \ell^-$  decays in the Standard Model and Beyond*.

### COVID-19 WORKING GROUP

**Megan Bromley**, PhD Student, School of Earth and Space Exploration, Arizona State University, USA.  
**Philipp Englert**, PhD Candidate, DESY, Hamburg, Germany.  
**Maryl Harris**, Research Technician, Monell Chemical Senses Center, USA.  
**Swanand Khanapurkar**, PhD Student, Department of Physics, Arizona State University, USA.  
**Nicholas Tran**, MS Student, Department of Computer Science, Arizona State University, USA.

### TEACHING AT UNIVERSITY OF NOTRE DAME DU LAC

- 2006 – 2010 **Tutor** for the Academic Services for Student Athletes for *Physics* and *Mathematics*
- 2006 – 2011 **Instructor** for *FORTRAN* for REU Summer Students
- August 2014 Lectures on *CP Violation*
- 2005 - 2011 **Teaching Assistant** for undergraduate and graduate courses. (Kaneb Outstanding Graduate TA Award recipient)  
*Graduate Courses:*
  - Classical Mechanics
  - Special and General Relativity
  - Quantum Field Theory I
  - Quantum Mechanics
  - Particle Physics
  - Atomic Physics
  - Statistical Mechanics

## Academic and Outreach Activities

Present	<b>Guest Editor</b> , "Symmetries in Particle Physics" – special edition for Symmetry	
2013 – Present	<b>Referee for peer reviewed journals</b> , JHEP, Nucl. Phys. B, EPJ C and Scipost	
September 2019	<b>DESY Theory Workshop 2019</b> , Chairperson for the Particle Phenomenology sessions	Hamburg, Germany.
2016	<b>CKM 2016</b> , Convener of WG7 – Charm Physics	Mumbai, India.
2012-2016	<b>Content Editor</b> , Global editions of Physics textbooks for Pearson Education.	Pearson India
2012	<b>GPS Conference 2012</b> , Founding Organizer	Notre Dame IN, USA.
2011-2012	<b>Graduate Physics Society</b> , Member of Founding Committee	Notre Dame IN, USA.
2010-2012	<b>Science Outreach</b> , Judge for several science fairs for junior and middle school students	Notre Dame IN, USA.
2007-2008	<b>Graduate Student Union</b> , Representative for the Physics Department	Notre Dame IN, USA.
2003-2005	<b>Institute Sports Committee</b> , Sports equipments acquisition and auditing at S N Bose National Center for Basic Sciences	Kolkata, India.

## Presentations

### PLENARY TALKS (7)

28 <sup>th</sup> May 2020	<b>COVID-19 Beyond Center Workshop</b> , "The Curious Case of Automated Contact Tracing"	Tempe, USA.
18 <sup>th</sup> May 2020	<b>CHARM 2020</b> , "Flavour Symmetries and CP violation in Charm"	Mexico City, Mexico.
28 <sup>th</sup> April 2020	<b>Quantum Universe Workshop</b> , "COVID-19 and a Theorist's Dilemma"	Hamburg, Germany.
2 <sup>nd</sup> December 2016	<b>CKM 2016</b> , "A Summary on Charm Dynamics from WG7"	Mumbai, India.
6 <sup>th</sup> September 2016	<b>CHARM 2016</b> , "Theoretical aspects on NP search in rare and (semi-)leptonic decays"	Bologna, Italy.
4 <sup>th</sup> April 2013	<b>XII IFAE, Cittadella Universitaria di Monserrato</b> , "A Higgs and the World of Flavour"	Cagliari, Italy.
16 <sup>th</sup> January 2013	<b>XX DAE-BRNS HEP Symposium</b> , "For When the Bells toll..."	Santiniketan, India.

### INVITED TALKS (12)

2 <sup>nd</sup> November 2020	<b>TOOLS 2020</b> , "HEPfit: The Bayesian MCMC for HEP"	Lyon, France.
23 <sup>rd</sup> July 2018	<b>Higgs Hunting 2018</b> , "Flavour Physics meets Heavy Higgs Searches"	Orsay-Paris, France.
24 <sup>th</sup> May 2018	<b>HXSWG Offshell Meetings: BSM/EFT studies</b> , "Looking Inside Gluon Fusion Loops"	Geneva, Switzerland.
9 <sup>th</sup> November 2017	<b>LHCb Implications 2017</b> , "CP violation in charm: from Rags to Riches"	Geneva, Switzerland.
30 <sup>th</sup> May 2017	<b>Beyond the LHCb Phase-1 Upgrade</b> , "The On-Shell Story"	Isola d'Elba, Italy.
23 <sup>rd</sup> May 2016	<b>4<sup>th</sup> B2TiP Workshop</b> , "Prospects of estimating hadronic uncertainties in $B \rightarrow K^* \gamma$ "	Pittsburgh, USA.
9 <sup>th</sup> March 2016	<b>Towards the Theory of Flavour</b> , "Musings on the Future of Beauty and Charm Dynamics"	Munich, Germany.
29 <sup>th</sup> October 2015	<b>3<sup>rd</sup> B2TiP Workshop</b> , "An Introduction to HEPfit"	Tsukuba, Japan.
27 <sup>th</sup> April 2015	<b>2<sup>nd</sup> B2TiP Workshop</b> , "Tutorial on SusyFit"	Krakow, Poland.
27 <sup>th</sup> April 2015	<b>2<sup>nd</sup> B2TiP Workshop</b> , "Diagrammatic approaches to understanding the SU(3) framework"	Krakow, Poland.
25 <sup>th</sup> February 2015	<b>New Physics at Belle II</b> , "An Introduction to SusyFit"	Karlsruhe, Germany.
10 <sup>th</sup> December 2014	<b>The landscape of Flavour Physics towards the high intensity era</b> , "The Charm of the Future"	Pisa, Italy.
18 <sup>th</sup> November 2011	<b>Workshop on Antiproton Physics at the Intensity Frontier</b> , "TAPAS and Charm Physics"	Fermilab, Batavia, USA

### SEMINARS (22)

16 <sup>th</sup> January 2020	<b>LPT, Orsay</b> , "Flavour Physics: A Precision Tool for Exploring Scale Separations"	Orsay, France.
11 <sup>th</sup> January 2019	<b>IACS</b> , "Looking Inside Gluon Fusion Loops for Effective Higgs Couplings"	Kolkata, India.
15 <sup>th</sup> August 2018	<b>Arizona State University</b> , "Higgs Dynamics with Effective Field Theories"	Tempe, USA.
7 <sup>th</sup> May 2018	<b>IFIC</b> , "Flavour@HEPfit"	Valencia, Spain.
25 <sup>th</sup> January 2018	<b>TIFR</b> , "Flavour Physics meets Heavy Higgs Searches"	Mumbai, India.
10 <sup>th</sup> July 2015	<b>CERN</b> , " $B \rightarrow K^* \mu^+ \mu^-$ decays in the Standard Model: a theoretical reappraisal"	Geneva, Switzerland.
15 <sup>th</sup> May 2013	<b>University of Edinburgh</b> , "The Industrial Revolution for Charm: From Sweatshops to Factories"	Edinburgh, UK.
21 <sup>st</sup> August 2012	<b>IMSc</b> , "Flavour in the Warped Extra Dimension"	Chennai, India.
9 <sup>th</sup> July 2012	<b>IMSc</b> , "Prospects of Charm"	Chennai, India.
21 <sup>st</sup> May 2012	<b>Università di Roma La Sapienza</b> , "Charm Beyond the Standard Model"	Roma, Italy.
22 <sup>nd</sup> December 2011	<b>University of Calcutta</b> , "Charm Dynamics: the Today and the Tomorrow"	Calcutta, India.
21 <sup>st</sup> December 2011	<b>University of Calcutta</b> , "Little Higgs Models; and with T Parity too...!"	Calcutta, India.
19 <sup>th</sup> December 2011	<b>SINP</b> , "Yet another Era of Charm Physics"	Calcutta, India.
1 <sup>st</sup> December 2011	<b>TIFR</b> , "Charm: A Portal for ND"	Mumbai, India.
15 <sup>th</sup> November 2011	<b>University of Notre Dame du Lac</b> , "ND @ ND"	Notre Dame IN, USA.
22 <sup>nd</sup> March 2011	<b>Argonne National Laboratory</b> , "LHT and Charm: the Expected, the Unexpected and the Gamble"	Argonne IL, USA.
17 <sup>th</sup> February 2011	<b>Michigan State University</b> , "LHT and Charm: Hopes from a Pocket Pair of Twos"	East Lansing MI, USA.

14 <sup>th</sup> February 2011	<b>University of Illinois at Urbana Champaign</b> , “LHT and Charm: Gambling with a Hand that Others have Folded”	Urbana IL, USA.
16 <sup>th</sup> December 2010	<b>Fermilab</b> , “LHT and Charm: Gambling in Standard Model’s Backyard”	Batavia IL, USA.
2 <sup>nd</sup> November 2010	<b>University of Notre Dame du Lac</b> , “Not LHT but LHT-like... and beyond”	Notre Dame IN, USA.
8 <sup>th</sup> December 2009	<b>University of Notre Dame du Lac</b> , “LHT @ Work: Unleashing the Jack in the Box”	Notre Dame IN, USA.
1 <sup>st</sup> July 2005	<b>SINP</b> , “Simplicial Homology and its Application to Electrical and Electronic Circuits”	Calcutta, India.

## CONTRIBUTED TALKS (17)

12 <sup>th</sup> July 2019	<b>EPS 2019</b> , “EFT Fits for Higgs and EW @FCC-ee”	Ghent, Belgium.
11 <sup>th</sup> July 2019	<b>EPS 2019</b> , “Disentangling Higgs and EW Measurements at Future Lepton Colliders”	Ghent, Belgium.
7 <sup>th</sup> June 2019	<b>WIN 2019</b> , “Disentangling Higgs and EW Measurements at Future Lepton Colliders”	Bari, Italy.
23 <sup>rd</sup> May 2018	<b>Planck 2018</b> , “Flavour Physics meets Heavy Higgs Searches”	Bonn, Germany.
28 <sup>th</sup> November 2017	<b>Terascale Workshop</b> , “Flavour Physics meets Heavy Higgs Searches”	Hamburg, Germany.
7 <sup>th</sup> July 2017	<b>EPS 2017</b> , “ $SU(3)_F$ Breaking through Final State Interactions and CP Asymmetries in $D \rightarrow PP$ Decays”	Venice, Italy.
6 <sup>th</sup> July 2017	<b>EPS 2017</b> , “Flavour Physics meets Heavy Higgs Searches”	Venice, Italy.
6 <sup>th</sup> August 2016	<b>ICHEP 2016</b> , “ $b \rightarrow s$ transitions in the Standard Model and Beyond”	Chicago IL, USA.
4 <sup>th</sup> August 2016	<b>ICHEP 2016</b> , “Higgs productions in the gluon fusion channel: a complete EFT analysis”	Chicago IL, USA.
17 <sup>th</sup> June 2016	<b>LHCP 2016</b> , “Test of the Standard Model and the Search for New Physics Using UFit”	Lund, Sweden.
25 <sup>th</sup> August 2015	<b>SUSY 2015</b> , “A critical examination of the $SU(3)$ framework in the hadronic decays of $D$ ”	Tahoe City CA, USA.
25 <sup>th</sup> August 2015	<b>SUSY 2015</b> , “An Introduction to HEPfit”	Tahoe City CA, USA.
24 <sup>th</sup> July 2015	<b>EPS 2015</b> , “A critical examination of the $SU(3)$ framework in the hadronic decays of $D$ ”	Vienna, Austria.
23 <sup>rd</sup> July 2015	<b>EPS 2015</b> , “Questioning the anomalies in $B \rightarrow K^* \mu^+ \mu^-$ decays”	Vienna, Austria.
20 <sup>th</sup> May 2015	<b>CHARM 2015</b> , “Charm loop contributions in $B \rightarrow K^* \mu^+ \mu^-$ decays”	Detroit MI, USA.
19 <sup>th</sup> May 2015	<b>CHARM 2015</b> , “A case for $SU(3)$ in $D \rightarrow PP$ decays”	Detroit MI, USA.
28 <sup>th</sup> May 2014	<b>Planck 2014</b> , “Probing Higgs couplings with high $p_T$ Higgs production”	Paris, France.

## Workshops & Conferences

November 2020	<b>TOOLS 2020</b> , Tools for High Energy Physics and Cosmology.	Lyon, France.
May 2020	<b>Beyond COVID-19 Workshop</b> , Conference on COVID-19 Exit Strategies.	Tempe, USA.
May 2020	<b>Charm 2020</b> , Conference on Flavour Physics.	Mexico City, Mexico.
April 2020	<b>Quantum Universe Workshop</b> , Conference on Particle Physics and Cosmology.	Hamburg, Germany.
October 2019	<b>Implications of LHCb measurements and future prospects 2019</b> , Conference on Flavour Physics.	Geneva, Switzerland.
September 2019	<b>Quantum field theory meets gravity</b> , DESY Theory Workshop.	Hamburg, Germany.
July 2019	<b>EPS 2019</b> , Conference on High Energy Physics.	Ghent, Belgium.
June 2019	<b>WIN 2019</b> , International Workshop on Weak Interactions and Neutrino.	Bari, Italy.
May 2019	<b>BSM with Precision Flavour Experiments</b> , Workshop on BSM and Flavour physics.	Munich, Germany.
October 2018	<b>Implications of LHCb measurements and future prospects 2018</b> , Conference on Flavour Physics.	Geneva, Switzerland.
September 2018	<b>Beyond Standard Model: Where do we go from here?</b> , Conference on High Energy Physics.	Firenze, Italy.
July 2018	<b>Higgs Hunting 2018</b> , Conference on High Energy Physics.	Orsay-Paris, France.
April 2018	<b>Planck 2018</b> , Conference on High Energy Physics.	Bonn, Germany.
November 2017	<b>Terascale Workshop</b> , Helmholtz Alliance Annual Meeting	Hamburg, Germany.
October 2017	<b>Implications of LHCb measurements and future prospects 2017</b> , Conference on Flavour Physics.	Geneva, Switzerland.
July 2017	<b>EPS 2017</b> , Conference on High Energy Physics.	Venice, Italy.
May 2017	<b>Beyond the LHCb Phase-1 Upgrade</b> , Conference on Flavour Physics.	Isola d’Elba, Italy.
December 2016	<b>CKM 2016</b> , Conference on Flavour Physics.	Mumbai, India.
September 2016	<b>CHARM 2016</b> , Conference on Charm Physics.	Bologna, Italy.
August 2016	<b>ICHEP 2016</b> , Conference on High Energy Physics.	Chicago IL, USA.
June 2016	<b>LHCP 2016</b> , 4 <sup>th</sup> Annual Large Hadron Collider Physics Conference.	Lund, Sweden.
June 2016	<b>Flavour and Electroweak Symmetry Breaking</b> , Workshop on Flavour Physics.	Anacapri, Italy.
April 2016	<b>4<sup>th</sup> B2TiP Workshop</b> , Belle Flavour Factory Workshop.	Pittsburgh, USA.
April 2016	<b>Higgs Tasting Workshop</b> , Workshop on Higgs Physics.	Benasque, Spain.
March 2016	<b>Toward The Theory of Flavour</b> , Munich, Germany.	Benasque, Spain.
April 2016	<b>3<sup>rd</sup> B2TiP Workshop</b> , Belle Flavour Factory Workshop.	Tsukuba, Japan.
November 2015	<b>Implications of LHCb measurements and future prospects 2015</b> , Conference on Flavour Physics.	Geneva, Switzerland.
September 2015	<b>Gearing up for LHC13</b> , Workshop on physics at the LHC.	Firenze, Italy.

August 2015	<b>SUSY 2015</b> , Conference on High Energy Physics.	<i>Tahoe City CA, USA.</i>
July 2015	<b>EPS 2015</b> , Conference on High Energy Physics.	<i>Vienna, Austria.</i>
May 2015	<b>CHARM 2015</b> , Conference on Charm Physics.	<i>Detroit MI, USA.</i>
April 2015	<b>2<sup>nd</sup> B2TiP Workshop</b> , Belle Flavour Factory Workshop.	<i>Cracovia, Poland.</i>
February 2015	<b>New Physics at Belle II</b> , Belle II meeting.	<i>Karlsruhe, Germany.</i>
December 2014	<b>The landscape of Flavour Physics towards the high intensity era</b> , Conference on Flavour Physics.	<i>Pisa, Italy.</i>
April 2013	<b>XII IFAE</b> , Conference on High Energy Physics.	<i>Cagliari, Italy.</i>
July 2011	<b>CTEQ Workshop 2011</b> , Summer School on QCD Analysis and Phenomenology	<i>Madison WI, USA.</i>
June 2011	<b>LHC – Fermilab HCP</b> , Sixth School on Hadron Collider Physics.	<i>Geneva, Switzerland.</i>
May 2011	<b>MadGraph Spring 2011</b> , Workshop for MadGraph and FeynRules developers.	<i>Batavia IL, USA.</i>
May 2011	<b>SLAC Summer Institute</b> , “Nu: Nature’s Mysterious Messengers”	<i>Menlo Park CA, USA.</i>

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