

23rd Conference on Flavor Physics and CP Violation (FPCP 2025)

Report of Contributions

Contribution ID: 1

Type: **not specified**

Opening talk

Monday 2 June 2025 09:20 (40 minutes)

Presenter: FAJFER, S

Contribution ID: 2

Type: **not specified**

Summary talk

Friday 6 June 2025 12:10 (40 minutes)

Presenter: LIBBY, James

Contribution ID: 3

Type: **not specified**

Review of Neutrino Physics

Wednesday 4 June 2025 09:00 (30 minutes)

Presenter: GONZALEZ, Concha

Session Classification: Neutrino

Contribution ID: 4

Type: **not specified**

Lattice Results

Monday 2 June 2025 14:00 (30 minutes)

Presenter: LESKOVECH, Luka

Session Classification: B meson decays

Contribution ID: 5

Type: **not specified**

Kaon theory

Tuesday 3 June 2025 13:30 (30 minutes)

Presenter: Dr STAMOU, Emmanuel (TU Dortmund)

Session Classification: Kaon physics

Contribution ID: 6

Type: **not specified**

QM Entanglement

Thursday 5 June 2025 14:00 (30 minutes)

Presenter: AGUILAR SAAVEDRA, Juan Antonio (Consejo Superior de Investigaciones Científicas (ES))

Session Classification: high-pT

Contribution ID: 7

Type: **not specified**

Rare kaon decays

Tuesday 3 June 2025 14:00 (30 minutes)

Presenter: MARCHEVSKI, Radoslav (École Polytechnique Fédérale de Lausanne (EPFL))

Session Classification: Kaon physics

Contribution ID: 8

Type: **not specified**

Experiment and prospects for EDMs

Tuesday 3 June 2025 16:30 (30 minutes)

Presenter: HIRAMOTO, Ayami

Session Classification: CP violation, EDMs

Contribution ID: **10**

Type: **not specified**

Theory of penguins and radiative decays

Monday 2 June 2025 16:00 (30 minutes)

Presenter: ALTMANNSHOFER, Wolfgang (UC Santa Cruz)

Session Classification: Rare decays

Contribution ID: **11**

Type: **not specified**

B spectroscopy

Monday 2 June 2025 17:00 (30 minutes)

Presenter: MIZUK, Roman (IJCLab, Orsay)

Session Classification: B spectroscopy

Contribution ID: **12**

Type: **not specified**

Theory Overview

Tuesday 3 June 2025 09:00 (30 minutes)

Presenter: PETROV, Alexey (University of South Carolina)

Session Classification: Charm

Contribution ID: 13

Type: **not specified**

Semileptonic and radiative decays

Tuesday 3 June 2025 11:00 (30 minutes)

Presenter: SONG, Weimin (Jilin University College of Physics (CN))

Session Classification: Charm

Contribution ID: 14

Type: **not specified**

Charm spectroscopy and exotics

Tuesday 3 June 2025 12:00 (30 minutes)

Presenter: MITCHELL, Ryan

Session Classification: Charm

Contribution ID: 15

Type: **not specified**

Theory Overview

Tuesday 3 June 2025 16:00 (30 minutes)

Presenter: RITZ, Adam

Session Classification: CP violation, EDMs

Contribution ID: **16**

Type: **not specified**

Axion searches

Tuesday 3 June 2025 17:30 (30 minutes)

Presenter: PLESTID, Ryan

Session Classification: Dark sector

Contribution ID: 17

Type: **not specified**

Time-dependent CP violation in B decays

Monday 2 June 2025 10:00 (30 minutes)

Presenter: FINOCCHIARO, Giuseppe

Session Classification: B meson decays

Contribution ID: **18**

Type: **not specified**

Semileptonic B decays, determination of V_{cb} and V_{ub}

Monday 2 June 2025 12:00 (30 minutes)

Presenter: GARG, Renu

Session Classification: B meson decays

Contribution ID: **19**

Type: **not specified**

Direct CP violation in charm decays

Tuesday 3 June 2025 10:00 (30 minutes)

Presenter: JIN, Yifan (Brookhaven National Laboratory (US))

Session Classification: Charm

Contribution ID: 20

Type: **not specified**

Dark sector physics – experimental searches

Tuesday 3 June 2025 17:00 (30 minutes)

Presenter: VOLPE, Roberta (Perugia University and INFN)

Session Classification: Dark sector

Contribution ID: 21

Type: **not specified**

Tau lepton decays

Friday 6 June 2025 10:00 (30 minutes)

Presenter: BANERJEE, Swagato (University of Louisville (US))

Session Classification: Charged leptons

Contribution ID: 22

Type: **not specified**

Belle II upgrade

Friday 6 June 2025 11:50 (20 minutes)

Presenter: KETTER, Christopher (University of Hawaii)

Session Classification: Future facilities

Contribution ID: 23

Type: **not specified**

Charmed baryons

Tuesday 3 June 2025 11:30 (30 minutes)

Presenter: MEZZADRI, Giulio

Session Classification: Charm

Contribution ID: 24

Type: **Parallel talk**

CPV in $K \rightarrow \mu^+ \mu^-$

I will discuss the possibility to extract short-distance parameters from the integrated CP asymmetry in $K \rightarrow \mu^+ \mu^-$, the interplay between $A_{\text{CP}}(K \rightarrow \mu^+ \mu^-)$ and other observables, and the prospects for measurement within an LHCb-like setup as a case study.

Author: DERY, Avital

Contribution ID: 25

Type: **Parallel talk**

Tripartite entanglement in B decays

The tripartite entanglement between two spins and orbital angular momentum (OAM) has been previously discussed for Higgs decays into two vector bosons in 2403.13942. For B decays into two spin-one particles it is basically the same situation, though I never published it. I want to highlight the possibility of such measurements, using the data already published by experiments to calculate the value of entanglement markers. Thereby, experiments may be motivated to do it properly. Entanglement measurements involving OAM are quite rare, and never done yet in high-energy physics.

Author: AGUILAR SAAVEDRA, Juan Antonio (Consejo Superior de Investigaciones Científicas (ES))

Contribution ID: 26

Type: **Parallel talk**

Modelling Quark-Hadron Duality Violation in Inclusive $B \rightarrow X_c \ell \bar{\nu}$

The Heavy Quark Expansion (HQE) is the main tool for calculating decay rates and kinematic moments of inclusive semi-leptonic B meson decays. The HQE manifests as an Operator Product Expansion (OPE) in terms of powers of the inverse heavy bottom quark mass ($1/m_b$). Using the HQE, the CKM matrix element V_{cb} has been extracted at percent-level precision from moments of inclusive $B \rightarrow X_c \ell \bar{\nu}$ decays. The calculations upon which the theoretical estimates rely are done in terms of quarks and gluons, which are not accessible for experiments. Quark Hadron Duality (QHD) allows for a translation of theoretical predictions at the quark-level to experimental observables at the hadron-level. Due to the increased accuracy in HQE predictions up to $\mathcal{O}(1/m_b^5)$, violation of the QHD may start to become a relevant limit to the achievable precision. When QHD is violated, the OPE stops being a valid expansion. In my talk, I will show how we can derive a model for the Quark Hadron Duality Violation and how it can enter different kinematic moments of the $B \rightarrow X_c \ell \bar{\nu}$ decays and consequently affect the inclusive determination of V_{cb} .

Authors: MILUTIN, Ilija Sibin; VOS, Keri (Nikhef National institute for subatomic physics (NL)); VERKADE, Rens; MANNEL, Thomas (Siegen U)

Contribution ID: 28

Type: **Parallel talk**

Charged Lepton Flavour Violating Meson Decays in Seesaw Models

The occurrence of neutrino oscillations demands the existence of flavour violation in charged lepton sector. The relation between the branching ratios of different charged lepton flavour violating (CLFV) decay modes depends on the details of the neutrino mass model. In this work, we consider the three types of simple seesaw mechanisms of neutrino masses and study the correlation between the radiative CLFV decays and the meson CLFV decays. We find that the meson CLFV decay branching ratios are negligibly small in type-II seesaw mechanism whereas they are constrained to be at least three (two) orders of magnitude smaller than the radiative CLFV decay branching ratios in the case of type-I (type-III) seesaw mechanism. Thus the relationship between these two modes of CLFV decays helps in distinguishing between different types of seesaw mechanism. If, the branching ratios of CLFV decays of mesons are larger than those of radiative CLFV decays, it provides a strong hint that the neutrino mass generating mechanism is more complicated than simple seesaw.

Authors: Dr MORE, Jai (INDIAN INSTITUTE OF TECHNOLOGY BOMBAY); RAO, Kumar (Indian Institute of Technology, Bombay (IITB)); SAHU, PURUSHOTTAM; Prof. UMASANKAR, Sankagiri (Indian Institute of Technology Bombay (IIT Bombay)); AWASTHI, praves

Contribution ID: 29

Type: **not specified**

Heavy Quark Theory

Monday 2 June 2025 11:00 (30 minutes)

Presenter: MANNEL, Thomas (Siegen U)

Session Classification: B meson decays

Contribution ID: **30**

Type: **not specified**

Interface of Lattice and Continuum

Thursday 5 June 2025 14:30 (30 minutes)

Presenter: GORBAHN, Martin (Liverpool University)

Session Classification: Extra session

Contribution ID: **32**

Type: **not specified**

High-pT Theory

Tuesday 3 June 2025 14:30 (30 minutes)

Presenter: HAISCH, Uli

Session Classification: High pT

Contribution ID: 33

Type: **not specified**

Results and Prospects from Short-Baseline Reactors and Accelerators

Wednesday 4 June 2025 10:00 (30 minutes)

Presenter: BENEVIDES RODRIGUES, Ohana

Session Classification: Neutrino

Contribution ID: 34

Type: **not specified**

Neutrinoless double beta decay and neutrino masses

Wednesday 4 June 2025 11:00 (30 minutes)

Presenter: PETTUS, Walter (Indiana University)

Session Classification: Neutrino

Contribution ID: 35

Type: **Parallel talk**

Probing quantum decoherence using data from B meson decays

The time evolution of neutral B mesons plays a fundamental role in determining key parameters of flavor physics. While their behavior is typically analyzed under the assumption of perfect quantum coherence, interactions with the surrounding environment can induce *decoherence*. Such environmental effects on neutral meson systems can be effectively described within the framework of open quantum systems. Decoherence can obscure the precise extraction of crucial parameters, such as the oscillation frequency Δm and the CP -violating parameter $\sin 2\beta$.

Using the available experimental data, we present the first combined analysis of mixing asymmetry and CP -asymmetry measurements for B_d mesons, demonstrating that decoherence parameter λ_d is nonzero with a significance of approximately 6σ . Furthermore, we establish the first experimental constraints on the decoherence parameter λ_s for B_s mesons, confirming its nonzero value at a significance level of 3σ .

Authors: ALOK, Ashutosh K.; KUMAR, Jitendra (IIT Jodhpur); Ms CHUNDAWAT, Neetu Raj Singh (Indian Institute of Technology Jodhpur); RAI, Saurabh; Prof. SANKAGIRI, Uma Sankar (IIT Bombay)

Contribution ID: 36

Type: **Parallel talk**

Search for dark sector at BESIII

The BESIII experiment is a symmetric e^+e^- collider operating at c.m. energy from 2.0 to 4.95 GeV. With the world's largest threshold production data set of J/Ψ (10 billion), $\Psi(3686)$ (2.6 billion), and $20fb^{-1}$ of D meson pairs from $\Psi(3770)$ decay, we are able to search for various dark sectors produced in e^+e^- annihilation and meson decay processes. In this talk, we report the search for K_s^0 invisible decay and $\Sigma \rightarrow p + invisible$, search for Axion-like particle with J/Ψ data, search for Z' invisible decay via $J/\Psi \rightarrow \mu^+\mu^-X$ and search for massless dark photon through the charm FCNC process $D^0 \rightarrow \gamma$ and D^{0*} .

Author: BIANCHI, Fabrizio

Contribution ID: 37

Type: **Parallel talk**

Search for rare decays with charm data at BESIII

The BESIII experiment has collected 2.6 billion of $\Psi(3686)$ events, 10 billion of J/Ψ events, 20 fb^{-1} of D meson pairs at 3.773 GeV, and 7.33 fb^{-1} $D_s D_s^*$ events from 4.128 to 4.226 GeV. The huge data samples allow us to search for rare processes in charm hadron decays. In this talk, we report the search for FCNC decay in $D_s^+ \rightarrow h(h')e^+e^-$, lepton number violation process $D_s^+ \rightarrow h^- h^0 e^+ e^+$ and $\phi \rightarrow \pi^+ \pi^+ e^- e^-$, and lepton flavor violation process $J/\Psi \rightarrow e\mu$ and $J/\Psi \rightarrow e\tau$. The search for J/Ψ weak decays containing D meson, $J/\Psi \rightarrow D^0 \mu^+ \mu^-$ and $J/\Psi \rightarrow D^0$ will also be presented.

Author: BIANCHI, Fabrizio

Contribution ID: **38**

Type: **not specified**

g-2 theory updates

Friday 6 June 2025 09:30 (30 minutes)

Presenter: BRUNO, Mattia (CERN)

Session Classification: Charged leptons

Contribution ID: 39

Type: **Parallel talk**

Mass spectrum of ground state heavy-light mesons in relativistic independent quark model

The confining strength or model parameters and constituent quark masses are determined after fitting the ground state masses with experimental data of respective mesons. We analyzed these from the hyperfine splitting of heavy-light and heavy flavored ground state mesons in the framework of relativistic independent quark (RIQ) model with one gluon exchange and centre of mass correction. For the s-wave mesons with spin parity $J^P = 0^-$ and 1^- , the masses obtained are in accordance with the experimental physical masses. The results will serve as good complementary tools in further study of dynamics of the meson and will behave as a foundation for the higher excited and exotic states of hadron.

Author: NAYAK, Lopamudra (NISER Bhubaneswar)

Contribution ID: 40

Type: **Parallel talk**

The Mu2e Experiment

The Mu2e experiment, based at Fermilab, will search for the coherent, neutrino-less conversion of a negative muon into an electron in the field of an aluminum nucleus, an example of Charged Lepton Flavor Violation (CLFV). Observation of CLFV at Mu2e would be an unambiguous signal of physics beyond the Standard Model (BSM). Mu2e aims to improve upon the previous upper limit by four orders of magnitude and reach an unprecedented single event sensitivity of 3×10^{-17} on the conversion rate. Mu2e is sensitive to a wide range of BSM models and will indirectly probe effective mass scales up to $10^4 \text{ TeV}/c^2$. To achieve its design goal, Mu2e will utilize an integrated system of solenoids to create an intense muon beam. The background will be kept at a sub-event level through careful detector design choices. The experiment is approaching a very important and exciting stage in its life cycle. Construction is almost complete. Commissioning is beginning and physics data-taking is scheduled for 2027. This talk will explore the theoretical motivations, design, and current status of the Mu2e experiment.

Author: MIDDLETON, Sophie (Caltech)

Contribution ID: 41

Type: **Parallel talk**

Heavy-flavour results from ATLAS experiment

This talk will overview the recent results on heavy-flavour hadron production and decays and spectroscopy of heavy-flavour exotic states obtained with Run-2 data. It will cover the most precise measurement of the B^0 meson lifetime, measurement of charmed meson production cross-section, studies of resonant structures in di-charmonium spectrum.

Author: SPEAKER, ATLAS**Co-author:** MEONI, Evelin (Universita della Calabria e INFN (IT))

Contribution ID: 42

Type: **not specified**

LFU and LUV in semileptonic B decays

Monday 2 June 2025 14:30 (30 minutes)

Presenter: FRANCO SEVILLA, Manuel (University of Maryland (US))

Session Classification: B meson decays

Contribution ID: 43

Type: **not specified**

Electroweak penguin and radiative B decays

Monday 2 June 2025 15:00 (30 minutes)

Presenter: SMITH, Eluned Anne (Massachusetts Inst. of Technology (US))

Session Classification: Rare decays

Contribution ID: 44

Type: **not specified**

LHCb upgrade

Friday 6 June 2025 11:30 (20 minutes)

Presenter: XU, Zehua (CERN)

Session Classification: Future facilities

Contribution ID: 45

Type: **Parallel talk**

Analysis of Lambda_b to Lambda(*) nu nu decays in light of recent Belle-II B+-> K+ nu nu data

The Belle-II experiment has recently reported the first measurement of $B^+ \rightarrow K^+ \nu \bar{\nu}$ decay which exceeds the Standard Model prediction by approximately 2.7σ . The deviation may indicate the presence of new physics beyond the Standard Model in the $b \rightarrow s \nu \nu$ sector. Under this assumption, we study the hadronic $\Lambda_b \rightarrow \Lambda(\rightarrow p\pi)$ and $\Lambda_b \rightarrow \Lambda^*(\rightarrow NK)\nu\nu$ decays within both the Standard Model and beyond. We work in a low-energy effective field theory framework with additional light right-handed neutrinos. We calculate the differential branching ratios of these decay modes and explore the implications of the Belle-II results through various observables.

Authors: Mr SHAMEER, Dargi (International Institute of Information Technology, Hyderabad); Dr DAS, Diganta (International Institute of Information Technology, Hyderabad); SAIN, Ria

Contribution ID: 46

Type: **Parallel talk**

The role of nonperturbative dynamics in D-meson mixing

The theoretical predictions for the $D - \bar{D}$ mixing parameters fall significantly short of experimental measurements, with discrepancies spanning several orders of magnitude. This divergence is largely attributed to the Glashow–Iliopoulos–Maiani (GIM) mechanism, which suppresses leading-order contributions. However, higher-order corrections and nonperturbative effects have the potential to mitigate this suppression, particularly through flavor SU(3) symmetry breaking. In this work, we explore the long-distance contributions arising from nonlocal QCD condensates, incorporating for the first time the impact of mixed condensates within multiple models. Our results demonstrate an improvement in the predicted values of $D - \bar{D}$ mixing parameters by an order of magnitude, providing insights into the role of nonperturbative QCD dynamics. While the theoretical estimates remain below experimental values, this study represents a crucial step toward bridging the gap between theory and observation, highlighting the importance of nonlocal QCD effects in understanding $D - \bar{D}$ mixing.

Author: MELIĆ, Blaženka (Rudjer Boskovic Institute)

Contribution ID: 47

Type: **Parallel talk**

Measurements of lepton-flavour universality in semileptonic B decay at Belle II

The first run of the Belle II experiment collected a 365 fb^{-1} sample of $e^+e^- \rightarrow B\bar{B}$ collisions at a centre-of-mass energy corresponding to the $\Upsilon(4S)$ resonance. These data, with low particle multiplicity, constrained initial state kinematics and excellent lepton identification, are an ideal environment to study lepton-flavour universality in semileptonic decays of the B meson.

We present results on the ratios of semitauonic decay rates compared to those to light leptons in both exclusive and inclusive B decay. These include new measurements of the ratios for exclusive $B \rightarrow D^{(*)}\ell\nu$ decays $R(D^{(*)})$ in events tagged by a semileptonic B decay.

Author: ROBERTSON, Steven (IPP / University of Alberta)

Contribution ID: 48

Type: **Parallel talk**

Measurements of electroweak penguin and lepton-flavour violating B decays to final states with missing energy at Belle and Belle II

The Belle and Belle II experiments have collected a 1.2 ab^{-1} sample of $e^+e^- \rightarrow B\bar{B}$ collisions at a centre-of-mass energy corresponding to the $\Upsilon(4S)$ resonance. These data, with low particle multiplicity and constrained initial state kinematics, are an ideal environment to search for rare electroweak penguin B decays and lepton-flavour-violating B decays to final states with missing energy from neutrinos.

Results from $b \rightarrow s\nu\bar{\nu}$ processes and their interpretation are presented. In addition, we present searches for the processes $B \rightarrow K^{(*)}\tau^+\tau^-$. Finally, we present our search for the lepton-flavour violating decay $B^0 \rightarrow K^{*0}\tau^\pm\ell^\mp$, where ℓ is an electron or muon, is described.

Author: ROBERTSON, Steven (IPP / University of Alberta)

Contribution ID: 49

Type: **Parallel talk**

Measurements of hadronic B decay rates at Belle and Belle II

The Belle and Belle II experiments have collected a 1.2 ab^{-1} sample of $e^+e^- \rightarrow B\bar{B}$ collisions at a centre-of-mass energy corresponding to the $\Upsilon(4S)$. The study of hadronic B decays in these data allow the precise measurement of absolute branching fractions and angular distributions of the decay products. These measurements provide tests of QCD and allow the generation of more realistic simulation samples. We present measurements of the decays $\bar{B}^0 \rightarrow D^+\pi^-\pi^0$ and B decays to baryons.

Author: ROBERTSON, Steven (IPP / University of Alberta)

Contribution ID: 50

Type: **Parallel talk**

Rare and baryonic decays of charmed hadrons at Belle and Belle II

The Belle and Belle II experiments have collected a 1.6 ab^{-1} sample of e^+e^- collision data at centre-of-mass energies near the $\Upsilon(nS)$ resonances. These samples contain a large number of $e^+e^- \rightarrow c\bar{c}$ events that produce charmed mesons and baryons. We present searches for rare flavour-changing neutral current processes and measure several radiative decays of the $D_{(s)}$ meson. Further, we study several decays of the Ξ_c baryon to determine branching fractions and decay asymmetries.

Author: ROBERTSON, Steven (IPP / University of Alberta)

Contribution ID: 51

Type: **Parallel talk**

Studies of hadron spectroscopy at Belle and Belle II

The Belle and Belle II experiments have collected a 1.6 ab^{-1} sample of e^+e^- collision data at centre-of-mass energies near the $\Upsilon(nS)$ resonances. These data include a 19.2 fb^{-1} sample of data collected at centre-of-mass energies near the $\Upsilon(10753)$ resonance. We present several scan results including $e^+e^- \rightarrow \Upsilon(nS)\eta$. In addition, we present a measurement of the B^0 and B^+ meson mass difference.

Author: ROBERTSON, Steven (IPP / University of Alberta)

Contribution ID: 53

Type: **not specified**

Direct CP violation in B decays

Monday 2 June 2025 11:30 (30 minutes)

Presenter: ARTUSO, Marina (Syracuse University (US))

Session Classification: B meson decays

Contribution ID: 54

Type: **not specified**

BSM physics probes at future neutrino facilities

Wednesday 4 June 2025 11:30 (30 minutes)

Presenter: SHOEMAKER, Ian (Virginia Tech)

Session Classification: Neutrino

Contribution ID: 55

Type: **not specified**

g-2 FNAL experiment

Friday 6 June 2025 09:00 (30 minutes)

Presenter: GIBBONS, Lawrence

Session Classification: Charged leptons

Contribution ID: 56

Type: **not specified**

PSI MEGII experiment

Friday 6 June 2025 11:00 (30 minutes)

Presenter: Prof. MORI, Toshinori (University of Tokyo (JP))

Session Classification: Charged leptons