17th International Conference on Heavy Quarks and Leptons (HQL 2025)

Report of Contributions

https://indico.ihep.ac.cn/e/25725

Contribution ID: **3** Type: **not specified**

Interferences in the quark sector of the general 2HDM from flavour physics

The general 2HDM allows for off-diagonal flavour violating couplings in the quark sector which are strongly constrained by experiments in traditional 2HDMs. We study how the allowed parameter space of the general 2HDM changes once interactions between 1-3 and 2-3 quark generations are included, generating new interference terms in the one loop diagrams relevant for meson mixing constraints and radiative decays. We show that this interference effect plays a crucial role in simultaneously fitting those constraints and the so-called charged current flavour anomalies. These couplings can be probed and further constrained by current and future measurements by the ATLAS detector via multi-top decay searches with multi-lepton and b-tagged jets.

Primary authors: Prof. JUSTE ROZAS, Aurelio (CERN); SIERRA, Cristian (上海交通大学); Prof. VAZQUEZ SCHROEDER, Tamara (CERN)

Presenter: SIERRA, Cristian (上海交通大学)

Session Classification: Poster Session

Track Classification: Scientific Program: CKM Matrix

Contribution ID: **4** Type: **not specified**

extremely strong evidence of CPV in $B^0 \to p\bar{p}K^+\pi^-$

The violation of the charge-parity (CP) transformation symmetry, which although has been observed in plenty of pure meson decay processes, was only confirmed just very recently by the LHCb collaboration in the four-body decay of the heavy baryon Λ_b^0, $\Lambda_b^0 \to pK^-\pi^+\pi^-$, through a comparison of the decay branching ratio with that of the CP-conjugate process.However, the detailed dynamics behind this CP asymmetry is obviously far from clear.
In this talk, we propose a formalism for the full analysis of the decay angular correlations in four-body cascade decays of heavy hadrons which can provide more information about the CP violation in these decays. To illustrate this, we apply the decay angular correlation analysis of CP violation to another four-body decay channel that involve baryons, $B^0 \to p\bar{p}K^+\pi^-$, which has also been investigated by the LHCb collaboration with no evidence of CP violation being found. Surprisingly, with the event yield extracted inversely from the published data of LHCb, we obtain non-zero CP asymmetries of about 10% corresponding to the decay angular correlations at larger than 5σ confidence level, which are considerably larger than the CPA asymmetries observed in the $\Lambda_b^0 \to pK^-\pi^+\pi^-$ channel, indicating that CP violation could have been observed in processes involving baryons much earlier if the full analysis of angular correlations had been performed. We suggest our experimental colleagues to perform full decay angular correlation analyses of CP violation in four-body decays of heavy hadrons, including the above two decay channels.

Primary authors: Mr YANG, Jian-Yu; Prof. GUO, Xin-Heng; ZHANG, Zhen-Hua (University of South China)

Presenter: ZHANG, Zhen-Hua (University of South China)

Session Classification: Poster Session

Track Classification: Scientific Program: CP Violation

Contribution ID: **5** Type: **not specified**

First observation of the charmless baryonic decay $B^+ \to \bar{\Lambda} p \bar{p} p$

Search for the charmless baryonic decay $B^+ \to \bar{\Lambda} p \bar{p} p$ is performed using proton-proton collision data recorded by the LHCb experiment, corresponding to an integrated luminosity of 5.4fb^{-1}. The branching fraction is measured to be $\mathcal{B}(B^+ \to \bar{\Lambda} p \bar{p} p) = (2.08 \pm 0.34 \pm 0.10 \pm 0.26) \times 10^{-7}$, where the first uncertainty is statistical, the second is systematic, and the third arises from the normalization channel. The CP asymmetry is measured to be $\mathcal{A}_{CP} = (5.4 \pm 15.6 \pm 2.4)\%$, where the uncertainties are statistical and systematic. The background-subtracted invariant mass distributions of baryon-antibaryon pairs exhibit pronounced enhancements at both kinematic thresholds.

Primary authors: LHCB, Collaboration (CERN); TANG, Ying’ao (Wuhan University)

Presenter: TANG, Ying’ao (Wuhan University)

Session Classification: Poster Session

Track Classification: Scientific Program: CP Violation

Contribution ID: **7** Type: **not specified**

Helicity amplitude analysis of chi_cJ -> phi phi

Charmonium state decays provide critical insights into Quantum Chromodynamics (QCD) dynamics. Early theoretical frameworks interpreted two-meson charmonium decays as perturbative QCD (pQCD) processes following helicity selection rules (HSR). BESIII observations of comparable chic1⟶phi + phi and chic0/chic2⟶phi + phi branching fractions demonstrate explicit HSR violations, compelling incorporation of non-perturbative QCD mechanisms. Three competing frameworks, pQCD with phi meson polarisation, 3P0 quark creation models, and DD-loop model, predict distinct helicity amplitude ratios for chicj⟶phi phi decays. Validation is performed through dedicated helicity amplitude analysis of 448.1 million psi(3686) events. Measured helicity amplitude ratios exhibit discrepancies from all theoretical predictions, challenging current chicj decay interpretations. These results necessitate the new non-perturbative QCD mechanisms and provide more constraints for further developing the models.

Primary author: SHI, Boan (UCAS)

Presenter: SHI, Boan (UCAS)

Session Classification: Poster Session

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **10** Type: **not specified**

The measurement of H->cc/ss at the Circular Electron-Positron Collider

The measurement of Higgs decays to charm or strange quarks is crucial for probing the Higgs couplings to second-generation fermions. The electron-positron collider offers a clean collision environment with minimal QCD backgrounds, providing an excellent opportunity to study these couplings. By leveraging advanced deep learning techniques, the precision of the signal strength measurements for H ⟶ cc and H ⟶ ss can be improved by a factor of two to three compared to traditional cut-based methods at the Circular Electron-Positron Collider (CEPC).

Primary author: 朱, 永峰

Presenter: 朱, 永峰

Session Classification: Poster Session

Track Classification: Scientific Program: Rare Decays

Contribution ID: **11** Type: **not specified**

Novel $|V_{cb}|$ extraction via Lorentz-boosted bc-tagging at the LHC

We present a novel method for measuring $|V_{cb}|$ at general-purpose experiments at the LHC using an advanced boosted-jet tagger to identify "bc signatures". When combined with the conventional small-radius jet approach, this method achieves a ˜30% improvement in $|V_{cb}|$ precision under HL-LHC projections, providing valuable insights into the V_{cb} puzzle. By leveraging Lorentz-boosted topology, it substantially suppresses backgrounds and effectively reduces uncertainties in flavor tagging efficiencies through an in-situ calibration technique, critical for enhancing measurement precision.
This poster is based on the work of 2503.00118.

Primary author: LI, Congqiao (Peking University)

Presenter: LI, Congqiao (Peking University)

Session Classification: Poster Session

Track Classification: Scientific Program: CKM Matrix

Contribution ID: **12** Type: **not specified**

通过矢量介子的光致产生过程研究质子的内部性质

质子作为最稳定的强子，对其内部结构和性质等问题的研究一直是粒子物理与核物理领域的前沿热点方向。质子内部性质最基本的内容可以用质子的电磁、弱力和引力相互作用的形状因子描述。直到目前，质子引力形状因子还没有被很好的确定下来。一个主要的原因在于，引力作用非常弱，远远小于电磁和弱相互作用力，超出了实验直接测量的极限。在本研究中，我们采用间接的策略，以矢量介子作为探针，通过研究矢量介子与质子的弹性散射过程 (Vp→Vp) 来揭示质子的内部结构特性。在低能标尺度下，Vp→Vp 过程则可以借助矢量介子主导模型，与矢量介子近阈值处的光致产生过程 (γp→Vp) 建立联系。基于光致产生过程丰富的截面实验数据，我们分别从轻、重矢量介子的光致产生过程中提取了引力形状因子，得到了质子内部结构的信息，包括质量分布，自旋分布和力学性质，这包含了来自夸克的贡献和胶子贡献的完备信息。与格点 QCD 方法相比，我们的研究方法无需依赖大规模计算资源，即可获得完备的引力形状因子结果。这对我们理解质子内部力学性质提供了又一理论路径，为未来的实验计划 CEBAF 和 EIC 项目提供重要参考。

Primary authors: FANCONG, zeng (Institute of High Energy Physics); WANG, Xiao-Yun (I)

Presenter: FANCONG, zeng (Institute of High Energy Physics)

Session Classification: Poster Session

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **13** Type: **not specified**

Evidence for H → μμ with CMS Run II Data and Projected Sensitivity at the HL-LHC

Evidence for Higgs boson decay to a pair of muons is presented, using proton-proton collision data at √s = 13 TeV, corresponding to an integrated luminosity of 137fb−1, recorded by the CMS experiment at the CERN LHC. This result
combines searches in four exclusive categories targeting the production of the Higgs boson via gluon fusion, via vector boson fusion, in association with a vector boson, and in association with a top quark-antiquark pair. An excess is observed with a significance of 3.0 standard deviations, where the expected significance is 2.5 for the Standard Model Higgs boson with a mass of 125.38 GeV. Extrapolations of the Run-2 H → μμ analyses from ATLAS and CMS to HL-LHC conditions predict a significant improvement in measurement precision.

Primary authors: CMS COLLABORATION; GUO, Qianying

Presenter: GUO, Qianying

Session Classification: Poster Session

Track Classification: Scientific Program: Rare Decays

Contribution ID: **14** Type: **not specified**

Form factors in semileptonic decay $D_s \to \phi\ell\nu$ from lattice QCD

Semi-leptonic decays offer an ideal place to deeply understand hadronic transitions in the non-perturbative region of QCD and explore the weak and strong interactions in the charm sector. Combining with experimental data, the CKM matrix element can be extracted, and it helps to test unitarity of CKM matrix and searching for new physics beyond SM. In this talk, the full lattice QCD calculations of $D_s \to \phi\ell\nu$ decay form factors will be presented using CLQCD ensembles.

Primary author: FAN, Gaofeng (Nanjing University)

Presenter: FAN, Gaofeng (Nanjing University)

Session Classification: Poster Session

Track Classification: Scientific Program: CKM Matrix

Contribution ID: **15** Type: **not specified**

Analysing $\Lambda_b \to \Lambda\nu\nu$ decay in light of $B \to K\nu\nu$ data

The Belle-II experiment has recently reported the first measurement of $B^+ \to K^+\nu\nu$ 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 $b \to s\nu\nu$sector. Under this assumption, we study the hadronic $\Lambda_b \to \Lambda\nu\nu$ and $\Lambda_b \to \Lambda^*(\to NK)\nu\nu$ 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.

Primary author: SAIN, RIA (Central china normal University)

Presenter: SAIN, RIA (Central china normal University)

Session Classification: Poster Session

Track Classification: Scientific Program: Rare Decays

Contribution ID: **16** Type: **not specified**

Decay Selector: A web-based tool for Amplitude exploration

We present an web-based platform for Amplitude Analysis, designed to facilitate the exploration of multi-body decays. In such analyses, the large number of possible decay chains often presents a significant challenge in constructing amplitudes.
Our tool offers a user-friendly graphical interface (GUI) that enables efficient sorting, filtering, filling, and validation of decay chains. Previously saved setups can be easily uploaded and resumed, allowing for a seamless continuation of work. Integration with the Particle Data Group (PDG) API enables quick inclusion of known resonances. Configurations can be saved and exported both as JSON files and as executable code within a custom framework using the helicity formalism to parameterize the angular structure of the amplitudes. We aim to collaborate with other developers to support multiple frameworks through dedicated parsers, thereby broadening the tool’s applicability to the wider amplitude analysis community.

Primary authors: HABERMANN, Kai (University of Bonn); NEUBERT, Sebastian (H)

Presenter: HABERMANN, Kai (University of Bonn)

Session Classification: Poster Session

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **17** Type: **not specified**

Precision calculation of charm baryon decay constants in lattice QCD

We present the first calculation of charmed baryon decay constants using 2+1 flavor gauge ensembles with lattice spacings ranging from 0.05 to 0.1 fm and pion masses between 136 and 310 MeV. Under SU(3) flavor symmetry, we construct the charmed baryon interpolating operators and compute the corresponding hadronic matrix elements to extract the bare decay constants for each ensemble. The non-perturbative renormalization is performed using the symmetric momentum-subtraction (SMOM) scheme. After performing systematic chiral and continuum extrapolations, we obtain the decay constants with 4-11% precision.

Primary author: 李, 磊毅 (上海交通大学)

Presenter: 李, 磊毅 (上海交通大学)

Session Classification: Poster Session

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **18** Type: **not specified**

Measurement of branching fractions of Λ_c^+ decays to $\Sigma^+\eta$ and $\Sigma^+\eta'$

By analyzing e^+e^- collision data taken at center-of-mass energies $\sqrt{s}$ between 4.600 and 4.699 GeV with the BESIII detector at the BEPCII collider, corresponding to an integrated luminosity of 4.5 fb^{-1}, we study the hadronic decays $\Lambda_c^+ \to \Sigma^+\eta$ and $\Lambda_c^+ \to \Sigma^+\eta'$ using the single-tag method. The branching fraction ratio of $\Lambda_c^+ \to \Sigma^+\eta$ relative to $\Lambda_c^+ \to \Sigma^+\pi^0$ is determined to be $0.305 \pm 0.046_{\rm stat.} \pm 0.007_{\rm syst.}$, and that of $\Lambda_c^+ \to \Sigma^+\eta'$ relative to $\Lambda_c^+ \to \Sigma^+\omega$ is $0.336 \pm 0.094_{\rm stat.} \pm 0.037_{\rm syst.}$. The ratio of $\frac{\mathcal{B}\left(\Lambda_c^+\to\Sigma^+\eta'\right)}{\mathcal{B}\left(\Lambda_c^+\to\Sigma^+\eta\right)}$ is determined to be $1.73 \pm 0.22_{\rm stat.} \pm 0.16_{\rm syst.}$. These results enrich our knowledge of charmed baryon decays.

Primary author: YUAN, Zhaoyang (University of Chinese Academy of Sciences)

Presenter: YUAN, Zhaoyang (University of Chinese Academy of Sciences)

Session Classification: Poster Session

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **19** Type: **not specified**

CPV in baryons (results from LHCb, BESIII)

Monday, 15 September 2025 08:50 (25 minutes)

Presenter: CHEN, Shanzhen (高能所（IHEP, CAS）)

Session Classification: Hot topic

Contribution ID: **20** Type: **not specified**

Status of muon g-2 theory

Monday, 15 September 2025 09:15 (25 minutes)

Presenter: STOKES, Finn McInnes

Session Classification: Hot topic

Contribution ID: **21** Type: **not specified**

FNAL muon g-2 final results

Monday, 15 September 2025 09:40 (25 minutes)

Presenter: LI, Bingzhi (Zhejiang Lab 之江实验室)

Session Classification: Hot topic

Contribution ID: **22** Type: **not specified**

Search for entanglement effects at high energies

Monday, 15 September 2025 10:05 (25 minutes)

(including top pair production at threshold and topomium)

Presenter: PARDOS, Carmen Diez

Session Classification: Hot topic

Contribution ID: **23** Type: **not specified**

Theoretical review on light meson and heavy hadron spectroscopy

Monday, 15 September 2025 11:00 (25 minutes)

Presenter: ZHAO, Qiang (Institute of High Energy Physics, Chinese Academy of Sciences)

Session Classification: Spectroscopy

Contribution ID: **24** Type: **not specified**

Light and Strange Meson Spectroscopy: New Results on Exotic and High-Mass Mesons from the COMPASS Experiment

Monday, 15 September 2025 12:15 (20 minutes)

Presenter: PAUL, Stephan (Technical University of Munich)

Session Classification: Spectroscopy

Contribution ID: **25** Type: **not specified**

Recent spectroscopy results from LHCb experiment

Monday, 15 September 2025 11:25 (25 minutes)

Presenter: REN, Zan (UCAS)

Session Classification: Spectroscopy

Contribution ID: **26** Type: **not specified**

Recent spectroscopy results from BESIII experiment

Monday, 15 September 2025 11:50 (25 minutes)

Presenter: ZHANG, Yateng (Zhengzhou University)

Session Classification: Spectroscopy

Contribution ID: **27** Type: **not specified**

Neutrino Masses and Mixing: Current Status and Open Questions

Monday, 15 September 2025 14:30 (25 minutes)

Presenter: LI, Yufeng (IHEP, Beijing)

Session Classification: Neutrino Physics

Contribution ID: **28** Type: **not specified**

Status of the Hyper-Kamiokande experiment

Monday, 15 September 2025 14:55 (25 minutes)

Presenter: KISIEL, Jan (University of Silesia in Katowice, Poland)

Session Classification: Neutrino Physics

Contribution ID: **29** Type: **not specified**

The DUNE Experiment: Status and Outlook

Monday, 15 September 2025 15:20 (25 minutes)

Presenter: BIAN, Jianming (University of California, Irvine)

Session Classification: Neutrino Physics

Contribution ID: **30** Type: **not specified**

Neutrinos in the Multi-Messenger Era

Monday, 15 September 2025 15:45 (25 minutes)

Presenter: SAPIENZA, Piera (INFN-LNS, Italy)

Session Classification: Neutrino Physics

Contribution ID: **31** Type: **not specified**

LFV/LFU theory

Monday, 15 September 2025 16:40 (25 minutes)

Presenter: ARDU, Marco

Session Classification: Precision Lepton Measurements

Contribution ID: **32** Type: **not specified**

Muon LFV/LFU measurements at JPARC, PSI, FNAL

Monday, 15 September 2025 17:05 (25 minutes)

Presenter: UCHIYAMA, Yusuke

Session Classification: Precision Lepton Measurements

Contribution ID: **33** Type: **not specified**

Tau LFV/LFU measurements

Monday, 15 September 2025 17:30 (25 minutes)

Presenter: BECHERER, Fabian

Session Classification: Precision Lepton Measurements

Contribution ID: **34** Type: **not specified**

Multi-top production calculation overview

Tuesday, 16 September 2025 09:00 (30 minutes)

Presenter: CAO, Qing-Hong (Peking University)

Session Classification: Top Quark Physics

Contribution ID: **35** Type: **not specified**

Top cross section and mass measurements

Tuesday, 16 September 2025 10:00 (30 minutes)

Presenter: LI, Haifeng (Shandong University)

Session Classification: Top Quark Physics

Contribution ID: **36** Type: **not specified**

Top quark properties measurements and searches for BSM signatures

Tuesday, 16 September 2025 09:30 (30 minutes)

Presenter: ZHANG, Huaqiao (IHEP)

Session Classification: Top Quark Physics

Contribution ID: **37** Type: **not specified**

Theory of beauty lifetimes, mixing and CP violation

Tuesday, 16 September 2025 11:00 (25 minutes)

Presenter: HAN, Jia-Jie

Session Classification: CP Violation

Contribution ID: **38** Type: **not specified**

TDCPV in B0 and Bs systems (results from LHCb, Belle II)

Tuesday, 16 September 2025 11:25 (20 minutes)

Presenter: LACAPRARA, Stefano

Session Classification: CP Violation

Contribution ID: **39** Type: **not specified**

Gamma including BESIII inputs (results from LHCb, Belle II, BESIII)

Wednesday, 17 September 2025 12:35 (20 minutes)

Presenter: WIEDERHOLD, Aidan Richard (University of Manchester)

Session Classification: CP Violation

Contribution ID: **40** Type: **not specified**

CPV in charmless B decays (not baryons) (results from LHCb, Belle II)

Tuesday, 16 September 2025 12:05 (20 minutes)

Presenter: NAKAO, Mikihiko (KEK)

Session Classification: CP Violation

Contribution ID: **41** Type: **not specified**

Public forum

Tuesday, 16 September 2025 14:00 (1 hour)

Presenter: WILKINSON, Guy (University of Oxford)

Session Classification: Public forum

Contribution ID: **42** Type: **not specified**

Recent results from LHCb on charged current decays of b-hadrons

Tuesday, 16 September 2025 15:30 (20 minutes)

Presenter: WU, Jie

Session Classification: CKM Matrix

Contribution ID: **43** Type: **not specified**

New measurements of |Vcb| and |Vub| at Belle and Belle II

Tuesday, 16 September 2025 15:50 (20 minutes)

Presenter: NOVOSEL, Anja (Jozef Stefan Institute)

Session Classification: CKM Matrix

Contribution ID: **44** Type: **not specified**

Experimental status of |Vcs| and |Vcd| at BES III

Tuesday, 16 September 2025 16:10 (20 minutes)

Presenter: CHEN, Chao (SUDA)

Session Classification: CKM Matrix

Contribution ID: **45** Type: **not specified**

Constraints from kaon physics and complementarity to other rare decay channels

Wednesday, 17 September 2025 09:00 (25 minutes)

Presenter: FENG, Xu (Peking University)

Session Classification: Kaon physics

Contribution ID: **46** Type: **not specified**

Status and future prospects for rare kaon decay measurements at NA62

Wednesday, 17 September 2025 09:25 (20 minutes)

Presenter: FIORENZA, Renato (INFN Napoli and CERN)

Session Classification: Kaon physics

Contribution ID: **47** Type: **not specified**

Status and future prospects for rare kaon decay measurements at KOTO(-II)

Wednesday, 17 September 2025 09:45 (25 minutes)

Presenter: SHIRAISHI, Ryota (Osaka University)

Session Classification: Kaon physics

Contribution ID: **48** Type: **not specified**

Status and future prospects for rare kaon decay measurements at LHCb and other LHC experiments

Wednesday, 17 September 2025 10:10 (20 minutes)

Presenter: GARCIA MARTIN, Luis Miguel (EPFL)

Session Classification: Kaon physics

Contribution ID: **49** Type: **not specified**

Long-distance contributions to Kaon decays on the lattice (rare Kaon L and SL decay, QED effects, radiative decays)

Wednesday, 17 September 2025 11:00 (30 minutes)

Presenter: CHAO, En-Hung (Columbia University)

Session Classification: Kaon physics

Contribution ID: **50** Type: **not specified**

Theory of charm lifetimes, mixing and CP violation

Wednesday, 17 September 2025 11:30 (25 minutes)

Presenter: LIU, Chia-Wei

Session Classification: CP Violation

Contribution ID: **51** Type: **not specified**

CPV in charm (results from LHCb, Belle II, BESIII, CMS)

Wednesday, 17 September 2025 11:55 (20 minutes)

Presenter: DAI, Xinchen

Session Classification: CP Violation

Contribution ID: **52** Type: **not specified**

Time-dependent results from ATLAS & CMS (including lifetimes and Bs->J/psi phi)

Tuesday, 16 September 2025 11:45 (20 minutes)

Presenter: CHEN, Xin (Tsinghua University)

Session Classification: CP Violation

Contribution ID: **53** Type: **not specified**

Quantum-correlation of neutral charmed mesons at BESIII

Wednesday, 17 September 2025 12:15 (20 minutes)

Presenter: SHEN, Wenhan (University of Chinese Academy of Sciences)

Session Classification: CP Violation

Contribution ID: **54** Type: **not specified**

Long-Baseline Neutrino Experiments: A Journey from Discovery to Precision and Beyond

Thursday, 18 September 2025 09:00 (25 minutes)

Presenter: LUDOVICI, Lucio (INFN Roma)

Session Classification: Neutrino Physics

Contribution ID: **55** Type: **not specified**

Experimental progress in neutrinoless double beta decay with a focus on LEGEND

Thursday, 18 September 2025 09:25 (25 minutes)

Presenter: CHIU, Pin-Jung (Department of Physics National Taiwan University)

Session Classification: Neutrino Physics

Contribution ID: **56** Type: **not specified**

Neutrinos and BSM Searches

Thursday, 18 September 2025 09:50 (25 minutes)

Presenter: LUCENTE, Michele (UNiversity of Bologna, Italy)

Session Classification: Neutrino Physics

Contribution ID: **57** Type: **not specified**

JUNO status and prospects

Thursday, 18 September 2025 10:15 (25 minutes)

Presenter: ZHAO, Jie (高能所)

Session Classification: Neutrino Physics

Contribution ID: **58** Type: **not specified**

Theory overview on semileptonic decays

Thursday, 18 September 2025 11:10 (25 minutes)

Presenter: LU, Cai-Dian (高能所)

Session Classification: CKM Matrix

Contribution ID: **59** Type: **not specified**

Inclusive B/D decays on lattice

Thursday, 18 September 2025 11:35 (20 minutes)

Presenter: HU, Zhi

Session Classification: CKM Matrix

Contribution ID: **60** Type: **not specified**

Recent Belle II results on tests of lepton flavour universality in semileptonic B-meson decays

Thursday, 18 September 2025 11:55 (20 minutes)

Presenter: ADAMCZYK, Karol (Institute of Nuclear Physics Polish Academy of Sciences)

Session Classification: CKM Matrix

Contribution ID: **61** Type: **not specified**

Measurements of lepton flavour universality at LHC

Thursday, 18 September 2025 12:15 (25 minutes)

Presenter: MARTEL, Lucas

Session Classification: CKM Matrix

Contribution ID: **62** Type: **not specified**

Physics of multiquark states

Thursday, 18 September 2025 14:30 (25 minutes)

Presenter: GUO, Feng-Kun (ITP, CAS)

Session Classification: Spectroscopy

Contribution ID: **63** Type: **not specified**

Recent spectroscopy results from Belle II experiment

Thursday, 18 September 2025 14:55 (25 minutes)

Presenter: YIN, Junhao (南开大学)

Session Classification: Spectroscopy

Contribution ID: **64** Type: **not specified**

Recent spectroscopy results from ATLAS and CMS experiment

Thursday, 18 September 2025 15:20 (25 minutes)

Presenter: HU, Zhen (Tsinghua University)

Session Classification: Spectroscopy

Contribution ID: **65** Type: **not specified**

Recent results on heavy quarks and leptons from Alice experiment

Thursday, 18 September 2025 15:45 (20 minutes)

Presenter: BAI, Xiaozhi (University of Science and Technology of China)

Session Classification: Spectroscopy

Contribution ID: **66** Type: **not specified**

Prospect of hadron spectroscopy at furure experiments

Thursday, 18 September 2025 16:35 (25 minutes)

Presenter: LIU, Beijiang (高能所)

Session Classification: Spectroscopy

Contribution ID: **67** Type: **not specified**

Rare charm decays - theory overview

Thursday, 18 September 2025 17:00 (20 minutes)

Presenter: SHI, Yuji (Shanghai Jiaotong University)

Session Classification: Rare decays

Contribution ID: **68** Type: **not specified**

Rare charm/charmonium decays from BESIII

Thursday, 18 September 2025 17:20 (20 minutes)

Presenter: CHE, Guorong (Nankai University)

Session Classification: Rare decays

Contribution ID: **69** Type: **not specified**

The semi-leptonic decays of charmed hadrons at BESIII

Thursday, 18 September 2025 17:40 (20 minutes)

Presenter: LI, Yangu (University of Chinese Academy of Sciences)

Session Classification: Rare decays

Contribution ID: **70** Type: **not specified**

Rare b decays - theory overview

Friday, 19 September 2025 09:00 (30 minutes)

Presenter: WANG, Yuming

Session Classification: Rare decays

Contribution ID: **71** Type: **not specified**

Rare b decay from BELLEII

Friday, 19 September 2025 09:30 (20 minutes)

Presenter: SCHMITT, Caspar (LMU Munich (Germany))

Session Classification: Rare decays

Contribution ID: **72** Type: **not specified**

Rare b decays from ATLAS / CMS

Friday, 19 September 2025 09:50 (20 minutes)

Presenter: WANG, Dayong (Peking University)

Session Classification: Rare decays

Contribution ID: **73** Type: **not specified**

Overview of rare decays at LHCb

Friday, 19 September 2025 10:10 (20 minutes)

Presenter: LONG, Thomas

Session Classification: Rare decays

Contribution ID: **74** Type: **not specified**

Non-tau LFV/LFU measurements at Belle and Belle II

Friday, 19 September 2025 11:00 (25 minutes)

Presenter: PATRA, Sourav (University of Cincinnati)

Session Classification: Precision Lepton Measurements

Contribution ID: **75** Type: **not specified**

Muon electric dipole moment measurements at PSI

Friday, 19 September 2025 11:25 (25 minutes)

Presenter: PAPA, Angela (P)

Session Classification: Precision Lepton Measurements

Contribution ID: **76** Type: **not specified**

Measurements of magnetic and electric dipole moments of hadrons

Friday, 19 September 2025 11:50 (25 minutes)

Presenter: NERI, Nicola (INFN Pisa)

Session Classification: Precision Lepton Measurements

Contribution ID: **77** Type: **not specified**

Flavour prospects at FCC-ee

Friday, 19 September 2025 14:30 (25 minutes)

Presenter: WILKINSON, Guy (University of Oxford)

Session Classification: New experiments

Contribution ID: **78** Type: **not specified**

Flavour prospects at CEPC

Friday, 19 September 2025 14:55 (25 minutes)

Presenter: LI, Lingfeng (HKUST)

Session Classification: New experiments

Contribution ID: **79** Type: **not specified**

The Super Tau-Charm Facility

Friday, 19 September 2025 15:20 (25 minutes)

Presenter: GENG, Cong (Sun Yat-Sen (Zhongshan) University)

Session Classification: New experiments

Contribution ID: **80** Type: **not specified**

FASERν2, FLArE and other future nu exp. at collider

Friday, 19 September 2025 15:45 (25 minutes)

Presenter: WU, Wenjie (CAS)

Session Classification: New experiments

Contribution ID: **81** Type: **not specified**

Registration

Monday, 15 September 2025 08:00 (40 minutes)

Contribution ID: **82** Type: **not specified**

The Production and Decay Dynamics of the Charmed Baryon Λ_c^+ in e^+e^- Annihilations near Threshold

The study of the charmed baryons is crucial for investigating the strong and weak interactions in the Standard Model and for gaining insights into the internal structure of baryons. In an e^+e^- experiment the lightest charmed baryon, Λ_c^+, can be produced in pairs through the single photon annihilation process. This process can be described by two complex electromagnetic form factors. The presence of a non-zero relative phase between these form factors gives rise to a transverse polarization of the charmed baryon and provides additional constraints on the dynamic parameters in the decays. In this article, we present the first observation of the transverse polarization of Λ_c^+ in the reaction $e^+e^- \to \Lambda_c^+\bar{\Lambda}_c^-$, based on 6.4 fb^{-1} of e^+e^- annihilation data collected at center-of-mass energies between 4600 MeV and 4951 MeV with the BESIII detector.
The decay asymmetry parameters and strong phase shift in the decays $\Lambda_c^+ \to pK_S^0$, $\Lambda\pi^+$, $\Sigma^0\pi^+$, $\Sigma^+\pi^0$ are also simultaneously extracted from the joint angular distributions.
These results are vital for understanding CP violation and its role in the matter-antimatter asymmetry of the Universe.

Primary authors: SUN, Hao (UCAS); WANG, Hongjian (Lanzhou University); HAN, Kunlin (University of Chinese Academy of Sciences); Prof. LI, Peirong (Lanzhou University); MA, Hailong (IHEP); Prof. PING, Ronggang (IHEP); Prof. LYU, Xiaorui (University of Chinese Academy of Sciences); ZHENG, Yangheng (University of Chinese Academy of Sciences)

Presenter: SUN, Hao (UCAS)

Session Classification: Poster Session

Track Classification: Scientific Program: CP Violation

Contribution ID: **83** Type: **not specified**

Full angular analysis of the Bˆ0⟶Kˆ* (892)ˆ0 μˆ+ μˆ- decay in proton-proton collisions at CMS

A complete set of optimized CP-averaged angular observables in the rare flavor-changing neutral-current decay $B^0 \rightarrow K^*(892)^0\mu^+\mu^-$, with $K^*(892)^0 \rightarrow K^+\pi^-$, is measured using the full Run 2 dataset of proton-proton collisions at $\sqrt{s} = 13$ TeV collected by the CMS detector, corresponding to an integrated luminosity of 140 fb^{-1}. The analysis is performed in six bins of the dimuon invariant mass squared (q^2) over the range 1.1<q^2<16 GeV^2, excluding the charmonium resonance regions. Angular parameters are obtained through unbinned maximum-likelihood fits to the reconstructed B^0 candidate mass and three decay angles, with detailed efficiency modeling and background parameterization. The measured observables achieve among the highest precision to date for this decay mode, enabling stringent tests of Standard Model predictions. Comparisons with multiple theoretical calculations reveal local tensions in specific observables, notably P_5' and P_2, consistent with anomalies reported by other experiments. These results provide a valuable contribution to the understanding of the $b \rightarrow sl^+l^-$ processes.

Primary authors: QIN, Xuelong (Peking University; Laser Fusion Research Center); WANG, Dayong (Peking University)

Presenter: QIN, Xuelong (Peking University; Laser Fusion Research Center)

Session Classification: Poster Session

Track Classification: Scientific Program: Rare Decays

Contribution ID: **84** Type: **not specified**

Probing Charm Production in Cold Nuclear Matter with the CBM Proton Beam Program

The Compressed Baryonic Matter (CBM) experiment at FAIR, with its unprecedented rate capabilities and precision vertexing, offers a unique opportunity to advance charm physics through its dedicated proton beam program. A central objective of this program is to investigate the production and propagation of charm hadrons in cold nuclear matter. Such studies will provide indispensable baseline measurements for heavy-ion collisions and deliver novel insights into the microscopic dynamics of the strong interaction.

The combination of excellent tracking, robust particle identification, and ultra-fast readout in CBM will facilitate high-precision measurements of charm production cross sections, nuclear modification factors, and flow observables at interaction rates beyond current experimental reach. These measurements are crucial for disentangling cold nuclear matter effects from those of the hot and dense medium created in heavy-ion collisions. Ultimately, the CBM proton program will refine our understanding of parton energy loss, hadronization mechanisms, and the manifestation of the strong force across the transition from hadronic to partonic degrees of freedom.

Exploiting a high-intensity proton beam on a variety of fixed targets, CBM will access rare charm probes—including open charm mesons (D^0, $D^\pm$), charm baryons (Λ_c), and hidden charm states (J/ψ, ψ'). The Micro Vertex Detector (MVD), with a decay-vertex resolution of about 50 μm, enables precise reconstruction of open charm decays. In this work, we demonstrate the performance of open charm meson and baryon reconstruction using the KFParticle Finder package, and discuss the challenges of primary vertex determination in events with multiple high-momentum charm particles.

Primary authors: Dr VASSILIEV, Iouri (GSI); Prof. KISEL, Ivan (Uni-Frankfurt, FIAS)

Presenter: Prof. KISEL, Ivan (Uni-Frankfurt, FIAS)

Session Classification: Poster Session

Track Classification: Scientific Program: New Experiments

Contribution ID: **85** Type: **not specified**

Observation of a family of all-charm tetraquarks at CMS

Three enigmatic structures, X(6600), X(6900), and X(7100), have emerged from the J/ψJ/ψ (J/ψ → μ+μ−) spectrum as candidate all-charm tetraquarks, a rare and exotic form of matter. Using 315 fb^{−1} of proton-proton collisions data recorded by the CMS detector, yielding 3.6 times more J/ψJ/ψ pairs than previous studies, one can achieve a sharper view of these states, with significantly improved precision. All three structures and the interference among them are observed with a statistical significance above five standard deviations, suggesting common JPC quantum numbers.

Primary author: ZHOU, Yilin (Fudan University)

Presenter: ZHOU, Yilin (Fudan University)

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **86** Type: **not specified**

Study of χ_c production in pPb collisions at $\sqrt{s_{NN}} = 8.16TeV$ energy with the CMS experiment

The modification of quarkonium state production in the deconfined QCD medium in nuclear collisions does not solely originate from the medium dissociation but rather is a collection of effects from initial to final states. Excited charmonium production in pPb collision can be thought of as a controlled environment to understand these effects. In particular, the production of the chi_c mesons, as p-wave quarkonium states, can provide more information about the feed-down and binding energy dependence of the charmonia in the nuclear collisions, as their masses lie in between the ground state and the $\psi(2S)$. In this talk, we present analysis results of the production of chi_c in pPb collisions at center-of-mass energy per nucleon pair of $\sqrt{s_{NN}} = 8.16TeV$. The data are collected by the CMS detector and correspond to an integrated luminosity of 175 nb^{-1}. The analysis measures the relative production of $\chi_{c1,2}$ with respect to J/ψ as a function of particle transverse momentum and rapidity, and event activity. The results are compared with other experiment measurements at the LHC with different rapidity ranges and proton-proton collision data and model calculation to further extend our understanding of χ_c state production in nuclear collisions. Given that the relative cross sections are consistent with the proton-proton results at similar collision energies, the findings rule out a strong additional suppression of the χ_c states relative to the $J/\psi states in pPb collisions.

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Session Classification: Poster Session

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **87** Type: **not specified**

Observation of X(6900) and evidence of X(7100) in the $J/\psi\psi(2S) \to \mu^+\mu^-\mu^+\mu^-$ mass spectrum

In the study of the $J/\psi J/\psi$ invariant mass spectrum, the CMS collaboration has observed three distinct structural features, labeled as X(6600), X(6900), and X(7100). In-depth analysis of the experimental data suggests that a theoretical model incorporating the quantum interference effects of these three resonance states best describes the observed mass spectrum distribution characteristics. This discovery implies that these three states share the same spin-parity quantum numbers (J^{PC}), providing crucial clues for understanding the nature of these exotic states.
As an extension in the $J/\psi\psi(2S)$ decay channel, the search is performed for structures near threshold in the $J/\psi\psi(2S) \to \mu^+\mu^-\mu^+\mu^-$ channel using a sample of proton-proton collisions at $\sqrt{s} = 13.0$ TeV and 13.6 TeV recorded by the CMS detector at the CERN LHC. The data correspond to an integrated luminosity of about 315 fb^{-1}. A threshold structure is observed near 6900 MeV with a significance in excess of five standard deviations ($>5\sigma$), and there is also evidence (4.3σ) for a second peak, in a model where the structures mutually interfere. The mass and width of the two peaks are measured to be $6876\,^{+46}_{-29} \pm 110$, $253\,^{+290}_{-100} \pm 120$ MeV and $7169\,^{+26\,+74}_{-52\,-70}$, $154\,^{+110\,+140}_{-82\,-160}$ MeV, which are consistent to within one standard deviation of the X(6900) and X(7100) structures previously observed in the $J/\psi J/\psi$ spectrum.

Primary author: 陈亮亮, UNKNOWN

Presenter: 陈亮亮, UNKNOWN

Session Classification: Poster Session

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **88** Type: **not specified**

Determination of the spin and parity of all-charm tetraquarks

The traditional quark model accounts for the existence of baryons, such as protons and neutrons, which consist of three quarks, as well as mesons, composed of a quark-antiquark pair. Only recently has substantial evidence started to accumulate for exotic states composed of four or five quarks and antiquarks. The exact nature of their internal structure remains uncertain. This paper reports the first measurement of quantum numbers of the recently discovered family of three all-charm tetraquarks, using data collected by the CMS experiment at the Large Hadron Collider from 2016 to 2018. The angular analysis techniques developed for the discovery and characterization of the Higgs boson have been applied to the new exotic states. The quantum numbers for parity P and charge conjugation C symmetries are found to be +1. The spin J of these exotic states is consistent with $2\hbar$, while $0\hbar$ and $1\hbar$ are excluded at 95% and 99% confidence level, respectively. The JPC=2++ assignment implies particular configurations of constituent spins and orbital angular momenta, which constrain the possible internal structure of these tetraquarks.

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Session Classification: Poster Session

Track Classification: Scientific Program: Spectroscopy

Contribution ID: **89** Type: **not specified**

Positron Detection System of Muonium-to-Antimuonium Conversion Experiment

The Muonium-to-Antimuonium Conversion Experiment (MACE) aims to investigate charged lepton flavor violation (cLFV) through investigating spontaneous muonium-to-antimuonium conversion. This process is detected using a positron detection system (PDS), which consists of a lead-free microchannel plate (MCP) and a BGO electromagnetic calorimeter (ECal). In this study, we conducted preliminary prototype experiments to evaluate the performance of the PDS. Using photomultiplier tubes (PMTs) coupled with BGO scintillation crystals, we measured the detector's time resolution, achieving a value of approximately 2.6 ns. Additionally, utilizing a positron beam at the Institute of High Energy Physics (IHEP), we determined the detection efficiency of the lead-free MCP for positrons in the energy range of 300 eV to 1200 eV, obtaining an efficiency about 30%. These results demonstrate the feasibility of the PDS for the MACE and provide critical insights into its operational performance.

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Session Classification: Poster Session

Track Classification: Scientific Program: Rare Decays