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Book of Abstracts

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Theory / 1

$\Xi_c - \Xi_c'$ mixing From Lattice QCD

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In heavy quark limit, the lowest-lying charmed baryons with two light quarks can form an SU(3) triplet and sextet. The Ξ_c in the SU(3) triplet and Ξ_c' in the sextet have the same J^{PC} quantum number and can mix due to the finite charm quark mass and the fact the strange quark is heavier than the up/down quark. We explore the Ξ_c-Ξ_c' mixing by calculating the two-point correlation functions of the Ξ_c and Ξ_c' baryons from lattice QCD. Based on the lattice data, we adopt two independent methods to determine the mixing angle between Ξ_c and Ξ_c'. After making the chiral and continuum extrapolation, it is found that the mixing angle θ is $1.2^\circ \pm 0.1^\circ$, which seems insufficient to account for the large SU(3) symmetry breaking effects found in weak decays of charmed baryons.

Theory / 2

Transverse-Momentum-Dependent Wave Functions of Pion from Lattice QCD

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We present a first lattice QCD calculation of the transverse-momentum-dependent wave functions (TMDWFs) of the pion using large-momentum effective theory. Numerical simulations are based on one ensemble with 2+1+1 flavors of highly improved staggered quarks action with lattice spacing a = 0.121 fm from the MILC Collaboration, and one with 2 +1 flavor clover fermions and tree-level Symanzik gauge action generated by the CLS Collaboration with a = 0.098 fm. As a key ingredient, the soft function is first obtained by incorporating the one-loop perturbative contributions and a proper normalization. Based on this and the equal-time quasi-TMDWFs simulated on the lattice, we extract the light-cone TMDWFs. The results are comparable between the two lattice ensembles and a comparison with phenomenological parametrization is made. Our studies provide a first attempt of ab initio calculation of TMDWFs which will eventually lead to crucial theory inputs for making predictions for exclusive processes under QCD factorization.

Theory / 3

Factorization of Non-Global LHC Observables and Resummation of Super-Leading Logarithms

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We present a systematic formalism based on a factorization theorem in soft-collinear effective theory to describe non-global observables at hadron colliders, such as gap-between-jets cross sections. The cross sections are factorized into convolutions of hard functions, capturing the dependence on the partonic center-of-mass energy, and low-energy matrix elements, which are sensitive to the low

scale characteristic of the veto imposed on energetic emissions into the gap between the jets. The scale evolution of both objects is governed by a renormalization-group equation, which we derive at one-loop order. By solving the evolution equation for the hard functions for arbitrary 2⟶M jet processes in the leading logarithmic approximation, we accomplish for the first time the all-order resummation of the so-called "super-leading logarithms" discovered in 2006, thereby solving an old problem of quantum field theory. We study the numerical size of the corresponding effects for different partonic scattering processes and explain why they are sizable for pp⟶2jets processes, but suppressed in H/Z+jet production. The super-leading logarithms are given by an alternating series, whose individual terms can be much larger than the resummed result, even in very high orders of the loop expansion. Resummation is therefore essential to control these effects. We find that the asymptotic fall-off of the resummed series is much weaker than for standard Sudakov form factors.

TeV / 5

Constraint for a light charged Higgs boson and its neutral partners from top quark pairs at the LHC

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The charged Higgs boson plays an essential role in distinguishing between a wide variety of standard model extensions with multiple Higgs doublets. We study the prospect of a light charged Higgs boson, produced by top quark pairs at the Large Hadron Collider (LHC), and decaying into a W boson and a pair of bottom quarks via an intermediate neutral Higgs boson (H_i). We reinterpret the cross sections of $WW\bar{b}b\bar{b}$ final states measured by the ATLAS collaboration at LHC 13 TeV in the presence of the aforementioned decay, in a relatively wide range of Higgs masses. We find improved agreements with the data and obtain limits on the total branching ratio of the decay chain. The limits impose the strongest constraints on the parameter space of type-I two-Higgs-doublet model for most Higgs masses sampled when H_i is the CP-odd Higgs boson A. We also calculate potential constraints with pseudodata in high-luminosity runs of the LHC.

Theory / 6

Automated calculation of Jet fragmentation at NLO in QCD

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We present FMNLO, a framework to combine general-purpose Monte Carlo generators and fragmentation functions (FFs). It is based on a hybrid scheme of phase-space slicing method and local subtraction method, and accurate to next-to-leading order (NLO) in QCD. The new framework has been interfaced to MG5_aMC@NLO and made publicly available in this work. We demonstrate its unique ability by giving theoretical predictions of various fragmentation measurements at the LHC, followed by comparison with the data. With the help of interpolation techniques, FMNLO allows for fast calculation of fragmentation processes for a large number of different FFs, which makes it a promising tool for future fits of FFs. As an example, we perform a NLO fit of parton fragmentation functions to unidentified charged hadrons using measurements at the LHC. We find the ATLAS data from inclusive dijet production show a strong constraining power. Notable disparities are found between our gluon FF and that of BKK, DSS and NNFF, indicating the necessities of additional constraints and data for gluon fragmentation function.

Theory / 7

Probing the spin-dependent fragmentation function in unpolarized pp and AA collisions at the LHC（Remote）

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The longitudinal spin transfer represents the probability density of producing longitudinally polarized hadrons from longitudinally polarized quarks or circularly polarized gluons. It thus was usually measured in polarized reactions or high-energy collisions where weak interaction dominates. In this work, we propose the dihadron polarization correlation as a novel probe of this quantity. Such an observable does not require the fragmenting partons to be polarized and therefore can be measured in the currently available experimental facilities, such as Belle, RHIC, Tevatron, and the LHC. We make quantitative predictions for these experiments. In light of the data already harvested, the experimental investigation of this observable provides more opportunity for the quantitative study of the longitudinal spin transfer. In particular, the measurements in *pp* collisions can significantly constrain the fragmentation function of a circularly polarized gluon.

References

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[2] X. Li, Z.X. Chen, S. Cao, S.Y. Wei, arXiv:2309.09487 (2023).

Theory / 8

Nonperturbative fitting in resummation calculation

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The resummation calculation (ResBos) is a widely used tool for the simulation of single vector boson production at colliders. As the improvement over the ResBos code by increasing the accuracy from NNLL+NLO to N^3LL+NNLO, the nonperturbative function needs to be updated. We propose a new non-perturbative function (IFY) that includes information about the rapidity of the system. The IFY functional form was fitted to data from fixed target experiments, the Tevatron, and the LHC. We find that the non-perturbative function has mild rapidity dependence based on the results of the fit.

Theory / 9

Top pair production in association with a W boson at the LHC

Authors: Bayu Hartanto HeribertusN[one]; Fernando Febres CorderoN[one]; Giuseppe BevilacquaN[one]; Jasmina NasufiN[one]; Laura ReinaN[one]; Malgorzata WorekN[one]; Manfred KrausN[one]; 环宇毕 [1]

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This presentation provides a phenomenological analysis of the production of $t\bar{t}W$ and $t\bar{t}Wj$ in the context of the Standard Model at the LHC with a center-of-mass energy of √s = 13 TeV. The analysis is focused on investigating various aspects of the computation, such as the impact of employing different theoretical modeling approaches, cross section ratio $\sigma_{t\bar{t}W^+}/\sigma_{t\bar{t}W^-}$, and the charge asymmetries.

Theory / **10**

Production and Decay of Top Quarks at Lepton Colliders at N3LO in QCD

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In this talk we will discuss the recent processes in the calculation of the high-order perturbative corrections to the semi-inclusive production and decay of top quarks at lepton colliders at N3LO in QCD. In particular, the talk will be focusing on the first high-precision calculation of the complete QCD corrections to the top-quark decay width Γ_t, W-helicity fractions and semi-inclusive distributions to the third order in the strong coupling constant α_s. We find, in particular, that the pure $\mathcal{O}(\alpha_s^3)$ correction decreases Γ_t by 0.8% of the previous $\mathcal{O}(\alpha_s^2)$ result, exceeding considerably the error estimated by the usual scale-variation prescription. With this critical piece of correction included, we arrive at the to-date most precise theoretical prediction which meets the envisaged precision request by future hadron and lepton colliders.

Theory / **11**

Operators Correlation in Electroweak Scattering at LHC

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To probe new physics without prior assumptions on UV models, the correlation of operators could be crucial in exposing the structure of UV completion.
When operators arise from the same heavy resonance, they are likely to correlate and their Wilson coefficients exhibit non-trivial relation, since both of them depend on the same UV parameters.
The aim of EFT analysis is to discover the correlation among operators, which might shed lights on UV completion.
For specific, if a precise measurement is consistent with the SM theory prediction, it might originate from a coherent cancellation among higher dimensional operators.
In this work, we investigate a strongly correlated cancellation of operators in electroweak scattering and attempt to expose the corresponding UV structure.
We also examine the operators correlation through a coupled channel analysis method and demonstrate that this correlation persists even when considering the uncertainties at HL-LHC.

On the other hand, since the operators connect different scattering channels through the reduction of H into v or h, the operators correlation in single top production will predict the total cross section of thq production, and the correlation in $pp \to h\gamma$ can precisely examine the new physics effects of the indirect search on the weak magnetic moment a_W.

Theory / **12**

Upgrade of Chinese LHCb Tier1 Site

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The report will introduce the construction status of the first LHCb (WLCG) tier1 site in China. The content will refer the progress of requesting the tier1 site, the site scalability, the current status and future work. The site is built under the cooperation of Chinese LHCb Collobaration and IHEP computing center.

Theory / **13**

Probing positivity at LHC with exclusive photon-fusion processes

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By tagging one or two intact protons in the forward direction, it is possible to select and measure exclusive photon-fusion processes at the LHC. The same processes can also be measured in heavy ion collisions, and are often denoted as ultraperipheral collisions (UPC) processes. Such measurements opens up the possibility to probe certain dimension-8 operators and their positivity bounds at the LHC. As an demonstration, we perform a phenomenological study on the $\gamma\gamma \to \ell^+\ell^-$ processes, and find out that the measurements of this process at the HL-LHC provides reaches on certain dimension-8 operator coefficients that are comparable to the ones at future lepton colliders. We also point out that the $\gamma q \to \gamma q$ process could potentially have better reaches on similar types of operators due to its larger cross section, but a more detailed experimental study is need to estimate the background of this process. The validity of effective field theory (EFT) and the robustness of the positivity interpretation are also discussed.

Theory / **14**

Possible large CP violation in charmed Lambda_b decays

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We propose that the cascade decay $\Lambda_b \to D(\to K^+\pi^-)N(\to p\pi^-)$ may serve as the discovery channel for baryonic CP violation. This decay chain is contributed by dominantly the amplitudes with the intermediate D state as D^0 or $\bar{D}^0$. The large weak phase between the two kinds of amplitudes suggests the possibility of significant CP violation. While the presence of undetermined strong phases may complicate the dependence of CP asymmetry, our phenomenological analysis demonstrates that CP violation remains prominent across a broad range of strong phases. The mechanism also applies to similar decay modes such as $\Lambda_b \to D(\to K^+K^-)\Lambda$. Considering the anticipated luminosity of LHCb, we conclude that these decay channels offer a promising opportunity to uncover CP violation in the baryon sector.

Theory / **15**

Double-mixing CP violation

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We propose a new kind of CP violation effect —the double-mixing CP asymmetry —in a type of cascade decays that involves at least two mixing neutral mesons in the decay chain. It is induced by the interference between different oscillation paths of the neutral mesons in the decay process. The double-mixing CP asymmetry is of critical importance for phenomenology, providing opportunities for clean determination of CKM phase angles free of uncertainties induced by the strong dynamics. To illustrate this point, we perform a phenomenological analysis on two examples: $B_s^0 \to \rho^0 K \to \rho^0(\pi^-\ell^+\nu_\ell)$ and $B^0 \to D^0 K \to D^0(\pi^+\ell^-\bar{\nu}_\ell)$. Our results demonstrate that the double-mixing CP asymmetry can be numerically significant in the absence of strong phases, as shown by the former example. Additionally, the latter example showcases the direct extraction of weak and strong phases from data, without the need for theoretical inputs.

TeV / **16**

Higgs boson pair production and decay to $b\bar{b}\gamma\gamma$ at NLO in QCD

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We calculate the total cross-section and differential distributions of Higgs boson pair production and decay to $b\bar{b}\gamma\gamma$ at NLO in QCD.

Plenary Session / **17**

Higgs properties and new physics beyond the SM

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The discovery of the Higgs boson at the Large Hadron Collider (LHC) has opened a new era in particle physics. Precise measurements of the properties of the Higgs boson are crucial for addressing several fundamental questions in the field. These include understanding the mechanism behind electroweak symmetry breaking, unraveling the origin of particle masses, and exploring potential sources of CP violation
that could explain the matter-antimatter asymmetry in the universe, and so on. In this talk, I will provide an overview of the recent advancements in Higgs physics, both within the framework of the Standard Model (SM) and beyond. By examining the latest research, we will gain insights into the properties and behavior of the Higgs boson,
shedding light on the fundamental workings of the universe.

TeV / **18**

Partial NLO electroweak corrections to Higgs pair production in gluon fusion

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We calculated partial SM NLO electroweak corrections to Higgs pair production in gluon fusion, which are proportional to triple Higgs self-interacting constant. Then we did the same calculations with the Standard Model Effective Field Theory (SMEFT) dimension-6 Higgs self-interacting operators, and calculated the cross sections corresponding to different SMEFT parameters.

Theory / **19**

Probing Inelastic Dark Matter at the LHC, FASER and STCF

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In this talk, we explore the potential of probing the inelastic dark matter (DM) model with an extra $U(1)_D$ gauge symmetry at the Large Hadron Collider, ForwArd Search ExpeRiment and Super Tau Charm Factory. To saturate the observed DM relic density, the mass splitting between two light dark states has to be small enough, and thus leads to some distinctive signatures at these colliders. By searching for the long-lived particle, the displaced muon-jets, the soft leptons, and the mono-photon events, we find that the inelastic DM mass in the range of 1 MeV to 210 GeV could be tested.

Theory / **20**

Hybrid Renormalization for Quasi Distribution Amplitudes of A Light Baryon

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We develop a hybrid scheme to renormalize quasi distribution amplitudes of a light baryon on the lattice, which combines the self-renormalization and ratio scheme. By employing self-renormalization, the UV divergences and linear divergence at large spatial separations in quasi distribution amplitudes are removed without introducing extra nonperturbative effects, while making a ratio with respect to the zero-momentum matrix element can properly remove the UV divergences in small spatial separations. As a specific application, distribution amplitudes of the Λ baryon made of uds are investigated, and the requisite equal-time correlators, which define quasi distribution amplitudes in coordinate space, are perturbatively calculated up to the next-to-leading order in strong coupling constant αs. These perturbative equal-time correlators are used to convert lattice QCD matrix elements to the continuum space during the renormalization process. Subsequently, quasi distribution amplitudes are matched onto lightcone distribution amplitudes by integrating out hard modes and the corresponding hard kernels are derived up to next-to-leading order in αs including the hybrid counterterms. These results are valuable in the lattice-based investigation of the lightcone distribution amplitudes of a light baryon from the first principles of QCD.

Theory / **21**

B meson anomalies and large $B^+ \to K^+\nu\bar{\nu}$ in non-universal $U(1)'$ models

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In view of both the latest LHCb measurement of $R_{K^{(*)}}$ and the new 2.8σ deviation reported by Belle II on $B^+ \to K^+\nu\bar{\nu}$ decays, we present a fit to the B meson anomalies for various one and two dimensional hypothesis including complex Wilson coefficients. We show in a model-independent way that the generic non-universal $U(1)'$ extensions of the SM, without flavour violation, fail to simultaneously fit those observables and corroborate that they can modify $\mathrm{BR}(B^+ \to K^+\nu\bar{\nu})$ up to only a 10%. In view of this deficit, we propose a new way in which those models can accommodate

the data at tree level by introducing lepton flavour violating couplings and non-diagonal elements of the charged lepton mixing matrix, with implications in future charged lepton flavour violation searches.

HF/HI/QCD / **22**

Resolving negative cross section of quarkonium hadroproduction using soft gluon factorization

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It was found that, using nonrelativistic QCD factorization, the predicted χ_{cJ} hadroproduction cross section at large p_T can be negative. The negative cross sections originate from terms proportional to plus function in ${}^3P_J^{[1]}$ channels, which are remnants of the infrared subtraction in matching the ${}^3P_J^{[1]}$ short-distance coefficients. In this article, we find that the above terms can be factorized into the nonperturbative ${}^3S_1^{[8]}$ soft gluon distribution function in the soft gluon factorization (SGF) framework. Therefore, the problem can be naturally resolved in SGF. With an appropriate choice of nonperturbative parameters, the SGF can indeed give positive predictions for χ_{cJ} production rates within the whole p_T region. The production of $\psi(2S)$ is also discussed, and there is no negative cross section problem.

Theory / **23**

Cosmological Phase Transitions in Composite Higgs Models

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We investigate cosmological phase transitions in various composite Higgs models consisting of four-dimensional asymptotically-free gauge field theories. Each model may lead to a confinementdeconfinement transition and a phase transition associated with the spontaneous breaking of a global symmetry that realizes the Standard Model Higgs field as a pseudo-Nambu-Goldstone boson. Based on the argument of universality, we discuss the order of the phase transition associated with the global symmetry breaking by studying the renormalization group flow of the corresponding linear sigma model at finite temperature, which is calculated by utilizing the ε-expansion technique at the one-loop order. Our analysis indicates that some composite Higgs models accommodate phenomenologically interesting first-order phase transitions.

Theory / **24**

Theoretical Motivations for Hidden Light Bosons

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The physics beyond the Standard Model (BSM) could be represented by a hidden sector at relatively low energy scales MeV-GeV and feeble couplings to SM. Their presence in our Universe would be revealed through indirect evidences such as small oscillations of SM parameters, cosmological and astrophysical considerations, and the complementary searches in accelerators. Here, I give an overview of these BSM models including axions and hidden photons.

Plenary Session / **25**

Neutrino as a window to TeV physics: from LHC to low-energy experiments

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I will talk about the roles of LHC and low-energy (high-precision) experiments in searching for new physics at the TeV scale by studying the properties and interactions of neutrinos.

Theory / **26**

Dark photon effects with the kinetic and mass mixing in $Z \to \tau^-\tau^+$

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A new $U(1)_X$ gauge boson field X can have renormalizable kinetic mixing with the standard model (SM) $U(1)_Y$ gauge boson field Y. Besides the dark photon kinetic mixing σ, there could be mass mixing by introducing the additional Higgs doublet with vev engaging in $U(1)_X$ and electroweak symmetry breaking simultaneously. The Z boson interaction with SM tau lepton is modified by defining the mixing ratio parameter ϵ, which shows the magnitude of the mass and kinetic mixing of dark photon. We investigate the Z boson phenomenology of dark photon model with both the kinetic mixing and mass mixing. The allowed parameter region is obtained by analyzing these constraints from the vector and axial-vector couplings $g^{\tau}_{V,A}$, the decay branching ratio $Br(Z \to \tau^-\tau^+)$ and tau lepton polarization in $Z \to \tau^-\tau^+$. We found that the mixing ratio plays important role in the Z boson features by choosing different ϵ values.
Further, we attempt to find the common regions to satisfy these above four bounds for $m_X > m_Z$ and $m_X < m_Z$.
However, the regions allowed by g^{τ}_A and $Br(Z \to \tau^-\tau^-)$ tends to the opposite direction so that there are not viable parameter spaces within 2σ errors. The problem can be solved within 3σ errors.

TeV / **27**

Probing the Higgs trilinear self-coupling through Higgs+jet production

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We present the calculation of the next-to-leading order corrections for Higgs+jet production at the Large Hadron Collider, that arise from the Higgs trilinear self-coupling (λ_{HHH}).
We use the method of large top-quark mass expansion to tackle the challenging two-loop virtual amplitude, and apply the Pad\'{e} approximation to extend the region of convergence of this expansion. We find that the λ_{HHH}-related corrections amount to 0.66% for the total cross section. For the invariant mass distribution and Higgs boson transverse momentum distribution, the corrections are mostly in the range $0.5\% \sim 0.7\%$. Our results can be used to set extra constraints on λ_{HHH} from the experimental data.

Theory / **28**

$B_{(s)} \to D^{**}_{(s)}$ form factors in HQEFT and model independent analysis of relevant semileptonic decays with NP effects

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The form factors of $B_{(s)}$ decays into P-wave excited charmed mesons (including $D_0^*(2300)$, $D_1(2430)$, $D_1(2420)$, $D_2^*(2460)$ and their strange counterparts, denoted generically as $D^{**}_{(s)}$) are systematically calculated via QCD sum rules in the framework of heavy quark effective field theory (HQEFT). We consider contributions up to the next leading order of heavy quark expansion and give all the relevant form factors, including the scalar and tensor ones only relevant for possible new physics effects. The expressions for the form factors in terms of several universal wave functions are derived via heavy quark expansion. These universal functions can be evaluated through QCD sum rules. Then, the numerical results of the form factors are presented. With the form factors given here, a model independent analysis of relevant semileptonic decays $B_{(s)} \to D^{**}_{(s)} l \bar{\nu}_l$ is performed, including the contributions from possible new physics effects. Our predictions for the differential decay widths, branching fractions and ratios of branching fractions $R(D^{**}_{(s)})$ may be tested in more precise experiments in the future.

Theory / **29**

Muon collider signatures for a Z' with a maximal $\mu - \tau$ coupling in $U(1)_{L_\mu - L_\tau}$

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Theory / **30**

Precise prediction for the top quark width

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We present the first analytic results of N3LO QCD corrections to the top-quark decay width. We focus on the dominant leading color contribution, which includes light-quark loops. At NNLO, this dominant contribution accounts for 95% of the total correction. The most precise prediction for the top-quark width is now 1.321 GeV for mt = 172.69 GeV.

Theory / **31**

Lattice study of singlet-assisted electroweak phase transition

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In this study, we use lattice to reveal nonperturbative information of the electroweak phase transition in the real-singlet extension of the Standard Model, based on the 2-loop 3D EFT framework.

Importantly, the new information is that the lattice determines the true nature of the electroweak phase transition, capable to identify it as the first order type or not, an important qualitative behavior to which perturbation theory is blind. In scenarios where perturbation theory implies a weakly first order phase transition, lattice is always more reliable than the perturbation theory. In this regime, the symmetry-breaking transition may be crossover rather than a true phase transition. On the other hand, for strong transitions, both methods yield quantitatively close results, particularly when 2-loop perturbation theory is used.

This nonperturbative framework holds potential for other Higgs-sector extensions of the SM. Besides, by holding two powerful tools, 2-loop perturbation scanning and lattice, we will explore associated phenomenology in the future.

Theory / **32**

Observation of new structure in the J/ψJ/ψ mass spectrum in proton-proton collisions at √s = 13 TeV

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A search is reported for near-threshold structures in the J/ψJ/ψ invariant mass spectrum produced in proton-proton collisions at √s = 13 TeV from data collected by the CMS experiment, corresponding to an integrated luminosity of 135 fb−1. A new structure is observed with a significance above 5 standard deviations at a mass of 6552 ± 10 (stat) ± 12 (syst) MeV. Another structure with even higher significance is found at a mass of 6927 ± 9 (stat) ± 4 (syst) MeV, which is consistent with the X(6900

) resonance reported by the LHCb experiment and confirmed by the ATLAS experiment. Evidence for another new structure, with a local significance of 4.1 standard deviations, is found at a mass of 7287+20 −18 (stat) ± 5 (syst) MeV. The masses and significances are obtained in a model without considering possible quantum mechanical interference between the resonances. Incorporating this interference provides a better description of the mass spectrum between the resonances and shifts the measured masses by up to 150 MeV.

Theory / **33**

Electroweak sphalerons, scalar multiplets, and symmetry breaking patterns

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In this study, we present a comprehensive analysis of the electroweak sphaleron formalism and its application to electroweak phase transition (EWPT) patterns in extensions of the Standard Model scalar sector with electroweak multiplets. We offer an equivalence proof for different choices for the form of sphaleron configurations; construct the previously unestablished high-dimensional SU(2) sphaleron transformation matrix; investigate the scalar multiplet topology map and baryon number charge relation; and revisit the required boundary conditions needed for solving the sphaleron field equations. We then scrutinize the leading order sphaleron dynamics in the context of a multi-step EWPT. We showcase two distinct analytical approaches for extending the SU(2) scalar multiplet to the standard model (SM) under differing EWPT scenarios, and perform an explicit calculation of the sphaleron energy using a septuplet example. In the context of a single-step EWPT leading to a mixed phase, we find that the additional multiplet's contribution to the sphaleron energy is negligible, primarily due to the prevailing constraint imposed by the ρ parameter. Conversely, in a two-step EWPT scenario, the sphaleron energy can achieve significantly high values during the initial phase, thereby markedly preserving baryon asymmetry if the universe undergoes a first-order EWPT. In both cases, we delineate the relationship between the sphaleron energy and the parameters relevant to dark matter phenomenology.

TeV / **34**

Search for Higgs boson pair production in the bbμμ final state at the LHC (Remote)

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The Higgs boson pair production via gluon-gluon fusion and vector boson fusion in the bbμμ final state at the LHC is studied to probe the Higgs self-coupling κλ and the four-boson HHVV coupling κ2V for the first time. A cut-based analysis and a machine-learning analysis using boosted decision trees are performed with categorizations and optimizations depending on the variations of these couplings. The expected sensitivities are extracted with different integrated luminosities assumed up to the full highluminosity LHC runs. The expected upper limit at 95% confidence level on the Higgs boson pair production is calculated as 47 (28) times the Standard Model cross section using the cut-based method (boosted decision trees) for the gluon-gluon fusion production and 928 for the vector boson fusion production, assuming an integrated luminosity of 3000 fbˆ−1. The expected

constraints on the couplings at 95% confidence level are calculated to be −13.8 < κλ < 19.1 (−10.0 < κλ < 15.5) and −3.4 < κ2V < 5.5 using the cut-based method (boosted decision trees), respectively, assuming an integrated luminosity of 3000 fb−1.

Theory / 35

MatchingEFT.jl: An Automated Tool for Tree and One-Loop Level Matching

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We present MatchingEFT.jl, an automated tool to extract hard region contribution of the tree-level and one-loop 1PI amplitude, which can be matched to the standard model effective theory (SMEFT) operator basis in ABC4EFT.
FeAnGen4EFT performs the feynman diagram generation for the specific scattering process using the designed universal feynrules output file (UFO) and Qgraf. It offers the designated Feynman diagrams' amplitudes explicitly to provide non-trivial check for the gauge invariance. It will use FORM script to process extracting hard region expansion for the output from the previous step. These results will be given in a physical basis such as P-basis and Y-basis in ABC4EFT by using the on-shell amplitude basis method for a further crosscheck. FeAmGen4SMEFT has been built with lightweight, generality, flexibility, specialization, and efficiency in mind.
These ingredients allow FeAmGen4SMEFT to have more applications beyond the matching based on the complete operator basis with the specific mass dimension offered by ABC4EFT. One of these applications includes the one-loop renormalization of arbitrary theories.
We have performed one-loop matching for some processes under the specified UV model and obtained consistent results with other papers.

Theory / 36

Elliptic anisotropy of hard probes from parton scatterings in small collision systems

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The hard probes, including jets and heavy flavors, play an important role in investigating the properties of quark–gluon plasma (QGP) formed in heavy-ion collisions. The positive elliptic flow of hard probes observed in semi-central Pb–Pb collisions indicates that the hard partons suffered strong interactions in the deconfined QCD medium and then obtain the collectivity. However, recent measurements show also a non-zero v_2 for high-p_{T} charged particles and heavy flavor hadrons in high-multiplicity p–Pb collisions for both mid and forward rapidities, whose origin is still debated.

In this contribution, we employ a multi-phase transport model (AMPT) to calculate the v_2 of jet particles and open heavy-flavour hadron decay muons in p–Pb collisions at mid and forward rapidity, respectively. The results are obtained using the two-particle correlation method and the advanced nonflow subtraction strategy. We will systematically introduce how the collectivity of hard partons are generated from parton scatterings, and then propagated to the final state in small collision systems. Comparisons with experimental results will be presented as well. This work will provide further insights into understanding the origin of elliptic anisotropy of hard probes in small collision systems, and has referential value for the future measurements.

Poster Session / 37

Improved Asymptotic Formulae for Statistical Interpretation Based on Likelihood Ratio Tests

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In this work, we try to improve the classic asymptotic formulae to describe the probability distribution of likelihood-ratio statistical tests. The idea is to split the probability distribution function into two parts. One part is universal and described by the asymptotic formulae. The other part is case-dependent and estimated explicitly using a 6-bin model proposed in this work. The latter is similar to doing toy simulations and hence is able to predict the discrete structures in the probability distributions. The new asymptotic formulae provide a much better differential description of the test statistics. The better performance is confirmed in two toy examples.

Theory / 38

Limiting FCNC induced by a CP symmetry of order 4

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CP4 3HDM is a three-Higgs-doublet model based on the CP symmetry of order 4 (CP4). Imposing CP4 leads to remarkable connections between the scalar and Yukawa sectors and unavoidably generates tree-level flavor-changing neutral couplings (FCNC). It remains unclear whether FCNC can be sufficiently suppressed in the CP4 3HDM. In this paper, we systematically explore this issue. We first develop an efficient scanning procedure which takes the quark masses and mixing as input and expresses the FCNC matrices in terms of physical quark observables and quark rotation parameters. This procedure allows us to explore the FCNC effects for all the Yukawa sectors possible within the CP4 3HDM. We find that, out of the eight possible CP4 Yukawa sectors, only two scenarios are compatible with the K, B, Bs and, in particular, D-meson oscillation constraints. The results of this work serve as clear guidelines for future phenomenological scans of the model.

Theory / 39

Aiming for Tops of ALPs with a Muon Collider

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Future muon colliders with center-of-mass energy of $\mathcal{O}(1-10)$ TeV can provide a clean high-energy environment with advantages in searches for TeV-scale axion-like particles (ALPs), pseudo-Nambu–Goldstone bosons associated with spontaneously broken global symmetries, which are widely predicted in physics beyond the Standard Model (SM).

We exploit ALP couplings to SM fermions, and guided by unitarity constraints, build a search strategy focusing on the ALP decay to top quark pairs.

Theory / 40

The installation progress of upgrade Upstream Tracker at LHCb Upgrade II

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The Upstream Tracker is a key component of the LHCb updating. Based on silicon strip sensors, the UT will contribute to efficient and high-speed track reconstruction. UT's installation is a long-term and challenging work. Fortunately, the installation of UT is compeleted earlier this year. It also passed many kinds of electronics and service tests. The details of installation and pre-tests for the UT detector will be introduced.

Theory / 41

Explaining the CDF W-mass shift and $(g-2)_\mu$ in a Z' scenario and its implications for the b \to s \ellˆ+ \ellˆ- processes

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In the past few years, several indirect hints for New Physics beyond the SM arose in precision measurements, e.g., $(g-2)_\mu$ and the W-boson mass. In this work, we consider a model containing new vector-like Fermion partner gauged under a new $U(1)'$ symmetry. It is found that the latest CDF m_W measurement and $(g-2)_\mu$ can be simultaneously accommodated. We have also considered several other experimental constraints, including the neutrino trident production, $Z \to \mu\mu$ decay, dimuon resonance searches at the LHC, etc. Implications for the $b \to s\ell^+\ell^-$ process will be discussed. (This work is based on 2205.02205 and 2307.05290.)

Theory / 42

Massive Scattering Amplitudes for Standard Model: On-shell Massless-Massive Correspondence

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We organize massive tree-level amplitudes in Standard Model by power counting and helicity category, and match them with their high energy origins. The construction of massive amplitudes

is based on the massive bootstrap method, decomposing internal and external structures, and the existing leading orders of massless-massive correspondence. For the matching of higher order components, we introduce the on-shell Higgsing mechanism first proposed by (R. Balkin et al., 2022) and further the discussion to propagators.

Theory / 43

The Prototype Design of PEB - a Component of the HGTD In-detector Electronics for the ATLAS Phase-II Upgrade

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The High Granularity Timing Detector (HGTD) is proposed as a part of the ATLAS Phase-II upgrade to mitigate the impact of pileup on object reconstruction by precisely measuring the time of tracks. In addition, HGTD also provides an instantaneous measurement of the luminosity. HGTD is composed of 8032 front-end modules. Each module consists of two Low Gain Avalanche Detectors (LGADs) of approximately 2 × 2cmˆ2 bump-bonded to two ATLAS LGAD Timing Integrated Read-Out Chips (ALTIROC) and held together by a module flex (flexible PCB). Each module will be connected to the Peripheral Electronics Boards (PEB) through a flex tail (another flexible PCB). The connections between on-detector and off-detector electronics are performed via optical fibers, high/low voltage cables, interlock cables and monitoring signal cables. The PEB acts as a bridge between the front-end modules and the off-detector systems. The optical fibers provide shared data streams for Timing, Trigger and Control (TTC), Detector Control System (DCS) and Data Acquisition System (DAQ), and dedicated data streams for the luminosity system. The PEB uses the low-power GigaBit Transmission chip (lpGBT) and the Versatile Link + Transceiver (VTRx+). The PEB also includes the 12 V to 1.2 V DC-DC converters (bPOL12v) for the digital and analogue voltages supplied to the front-end modules. The supply voltages are monitored using the internal multiplexed ADC on the lpGBTs. Since the input channel number of this ADC is limited to 8, a multiplexing chip is required to handle all the signals connected to PEB. A full custom 64-to-1 multiplexing ASIC (MUX64) has been developed with a radiation tolerance suitable for its implementation on the PEB. According to the optimization of mirror structure for the layout of the modules, 6 types of PEBs need to be designed for HGTD. Based on previous development experience, the PEB 1F was chosen to be designed first as a prototype since it is the most complicated PEB type, which supports up to 55 front-end modules with 12 lpGBT, 9 VTRx+ and 52 bPOL12v in a very limited space. The requirements and overall specifications of the electronics of HGTD will be presented as well as the technical design and the project status.

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Dark matter distribution, structure formation and the potential to distinguish thermal histories of dark matter.

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It is important to understand the implications of current observational constraints and potential signatures on the thermal history of dark matter. Using the freeze-in/-out scenarios as templates, we

revisit dark-matter production by solving the Boltzmann equations at the level of the phase-space distribution. We also investigate the current Lyman-alpha constraints on mass of the dark matter and build the connection between the mass and the production mechanism of dark matter and find that the current observation on structure formation can be imposed to constrain the decoupling temperatures and the phase-space distribution of dark matter. We further explore the potential of distinguishing different possible thermal histories of dark matter with hypothetical future observational data. This method can be more generally applied to other scenarios.

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Double Parton Scattering Effect in the Measurement of W-Mass

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Recently, the W boson mass measured by the CDF-II collaboration shows large tension with the standard model prediction and other measurements. In this work, we look into the double parton scattering (DPS) contribution in CDF-II W mass measurement. We show that the DPS process can increase the measured mass as $\Delta M_W = 20 - 200$ MeV for the missing transverse momentum fit and $\Delta M_W = 0 - 50$ MeV for the transverse mass fit. It is comparable to the W-mass tension and should be take into consideration. The DPS effect can also appears in other inclusive measurements, since it contributes $\sim 10^{-2}$ events in total and cause a $\mathcal{O}(10^{-2}) - \mathcal{O}(10^{-1})$ GeV shift of the missing transverse momentum.

Theory / **47**

Hunting for sterile neutrino at colliders

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We study the feasibility of observing sterile neutrino at the high energy colliders, using direct and indirect production channels in heavy meson/baryon and Higgs decays. It is found that these processes may set certain new constraints on the mass of sterile netrino in present running and next generation experiments.

Theory / **48**

Probing Neutral Triple Gauge Couplings at the LHC, CEPC and SPPC

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We study probes of neutral triple gauge couplings (nTGCs) at the LHC, CEPC and SPPC. The nTGCs provide a unique window to the new physics beyond the Standard Model (SM) because they can arise from SM effective field theory (SMEFT) operators that respect the full electroweak gauge group $\mathrm{SU(2)_L} \otimes \mathrm{U(1)_Y}$ of the SM only at the level of dimension-8 or higher. We derive the neutral triple gauge vertices (nTGVs) generated by these dimension-8 operators in the broken phase and map them onto a newly generalized form factor formulation, which takes into account only the residual $\mathrm{U(1)_{em}}$ gauge symmetry. Using this mapping, we derive new relations between the form factors that guarantee a truly consistent form factor formulation of the nTGVs and remove large unphysical energy-dependent terms. We then analyze the sensitivity reaches of the LHC, CEPC and SPPC for probing the nTGCs via both the dimension-8 nTGC operators and the corresponding nTGC form factors. We compare their sensitivities with the existing LHC measurements of nTGCs and with those of future colliders.

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$B \to D$ form factors beyond leading power and extraction of $|V_{cb}|$ and $R(D)$

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Unveiling time-varying signals of ultralight bosonic dark matter at collider and beam dump experiments

Theory / **52**

Heavy long-lived coannihilation partner from inelastic Dark Matter model and its signatures at the LHC

Theory / **53**

利用有限温度有效理论研究电弱相变

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Theory / **54**

BBN 和 CMB 限制低能标新物理

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Theory / **55**

Testing Complex Singlet Scalar Cosmology at the Large Hadron Collider

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Theory / **56**

Massive gauge theory with quasigluon for hot SU(N) : Phase transition and thermodynamics

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Theory / **57**

Electroweak phase transitions proceed via bubbles vs. domain walls (Remote)

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Plenary Session / **58**

Theory overview: Collider Physics

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Plenary Session / **59**

Precision Higgs measurements at the LHC

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Search for HH production at the LHC

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Plenary Session / **61**

BSM/rare Higgs

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Plenary Session / **62**

Theory overview: Heavy flavor physics

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Plenary Session / **63**

重味谱学

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Plenary Session / **64**

Search for rare decays at LHCb

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Plenary Session / **65**

ALICE 实验中集体运动研究进展

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Plenary Session / **66**

Theory overview: QCD

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Precision prediction for top quark physics

Top quark is the heaviest particle in the standard model. Once produced, the top quark immediately decays to a W boson and a bottom quark before hadronization. Precision studies for top quark physic plays essential role in the validity of the Standard Model and exploring potential avenues for new physics. In this talk I will review recently theoretical development in top quark physics, which includes the theoretical efforts for top quark production and decay.

Plenary Session / **67**

SM measurements at the LHC (+Top)

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CPV

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Plenary Session / **69**

CEPC review

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ATLAS upgrade

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Plenary Session / **71**

CMS upgrade

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Plenary Session / **72**

LHCb upgrade

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Plenary Session / **73**

ALICE upgrade

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Plenary Session / **74**

Theory overview: Heavy ion physics

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ALICE 实验中奇异强子的产生

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Plenary Session / **76**

ALICE 实验中重夸克的产生与输运

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Plenary Session / **77**

Heavy Ion physics at ATLAS and CMS

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Plenary Session / **78**

Theory Overview: Neutrino Physics

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Plenary Session / **79**

SUSY results at LHC

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Plenary Session / **80**

Dark matter and unconventional searches at the LHC

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Exotics (non-SUSY) searches at the LHC (+Flavor)

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Speech from SJTU-TDLI and CPS

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Speech from Funding Agency

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Speech from CPS High Energy Branch

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Announcements from LOC

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ATLAS report

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CMS report

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LHCb report

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ALICE report

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Theory overview: New Physics at the LHC: SMEFT and Beyond

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Machine Learning at LHC

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CLHCP2023 Summary

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Announcements

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Status of USTC-IME Pre-production sensor for the ATLAS High Granularity Timing Detector

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First results of USTC AC-coupled LGADs

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Electronics test results of Altiroc2 and Altiroc3

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HGTD module assembly and module test at USTC

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ATLAS High granularity timing detector activity at IHEP/NJU

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IHEP-IME radiation hard LGAD sensor pre-production for ATLAS High granularity timing detector

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The Prototype Design of PEB - a Component of the HGTD In-detector Electronics for the ATLAS Phase-II Upgrade

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R&D of AC-LGAD based 4D tracker with precision timing information for HL-LHC and the future colliders

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Module performance study for the High Granularity Timing Detector of ATLAS

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Radiation Tolerance of the MUX64 for the High Granularity Timing Detector of ATLAS

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Automatic Module assembly development for ATLAS High granularity timing detector

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HGTD PEB DC/DC Power Block in Low Temperature and Magnetic Field Operation

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Performance of USTC-IME sensors in test beams at DESY and CERN

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CMS Endcap Timing Layer of MTD

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MTD sensor and assembly

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HGCal MAC status at IHEP

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HGCal SQC at IHEP and domestric silicon sensor R&D for calorimeter

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Computing vision QC in HGCal production

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基于 SystemC 对 FOCAL-E 像素层进行模拟分析

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FOCAL 探测器像素层数据分析现状

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ECAL simulation for LHCb Upgrade II

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Testbeam results of the LHCb Upgrade II ECAL prototype

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Performance of the GAGG crystal for LHCb Upgrade II ECAL

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ATLAS ITk Strip Module Site Qualification at IHEP

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Cold Noise Study in ATLAS ITk Strip Detectors

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SEE test of production ASICs in CSNS

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A study on the feasibility of CSNS becoming an ATLAS ITk sensor QA irradiation site

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Installation of LHCb Upstream Tracker

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Simulation of UT for LHCb Upgrade II

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Early Run3 H→γγ fiducial Cross-Section measurement

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Test of CP Invariance in Higgs Boson Vector-Boson-Fusion Production Usin >gamgam Channel with the ATLAS Detector

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Novel photon energy calibration method and Higgs mass measurement

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(Remote) Measurement of the H->ZZ->4l cross-sections in pp collisions at 1

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Measurements of inclusive and differential cross sections for the Higgs boson production and decay to four-leptons in proton-proton collisions at √s = 13 TeV

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Legacy search for the non-resonant production of Higgs boson pairs via gluon fus bosonfusion in the □□□□ final state in proton-proton collisions at √s = 13 TeV with the ATLAS detector (remote)

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Studies of new Higgs boson interactions through nonresonant HH production in final state in pp collisions at √s = 13 TeV with the ATLAS detector

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Preliminary Results on Higgs Pair Production in Multi-lepton Channel with the ATLAS Experiment

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Search for diHiggs with VHH (Remote)

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TeV / 133

Higgs mass and width measurement in ZZ to 4-leptons final state with full Run2 data (CMS)

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TeV / 134

Measurement of Higgs boson mass and width with LHC run2 data at the ATLAS e

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B(s)->D(*)phi

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Charm spetroscopy at LHCb

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Interference fit to the double Jpsi mass spectrum at CMS

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b-hadron FCNC decays at LHCb

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Ds and D+ production in pPb

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Psi(2S)/Jpsi versus multiplicity in pp

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Bs->phiphi

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lhcb EW results

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Associated quarkonium production

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Dicharm decay of beauty baryons

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Omegac0 two-body hadronic decays at LHCb

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B->D*K

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Bs->Ds1K

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Remote

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Search for the exotic decay of the Higgs boson into a Z boson and a light pseudo-scalar decaying into two photons in pp collisions at 13TeV (CMS)

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TeV / **150**

Search for extra Higgs bosons through same-sign top-quark production in association with an extra jet(Remote)

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Searches for lepton flavour violation in Higgs boson decays, H → eτ and H

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TeV / 152

Searches for Lepton-flavour-violating decays of the Higgs boson

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TeV / 153

Search for a standard model-like Higgs boson in the mass range between 70 and 110 GeV GeV in the diphoton final state in proton-proton collisions at 13 TeV (CMS)

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Evidence for the Higgs boson decay to a Z boson and a photon at the LHC

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TeV / 156

Run2 combination of the Higgs boson decay to a Z boson and a photon at the LHC

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Interpretations of the measurements of Higgs boson production and decay rates and differential cross-sections based on the Nature paper(remote)

Corresponding Author: zyjonah@sjtu.edu.cn

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CMS Higgs and double Higgs combinations (Remote)

Corresponding Author: jialin.guo@ihep.ac.cn

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Measurement of ttW/ttH production in multilepton final states with ATLAS Run-2 data

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Measurement of Higgs boson decaying into $b\bar{b}$ using Run2 dataset at the ATLAS experiment

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Non-prompt Λc+ production with machine learning in p–Pb collisions at √sNN = 5.02 TeV with ALICE

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HF/HI/QCD / **162**

ALICE 实验超氚产生测量 (remote)

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HF/HI/QCD / **163**

Study of heavy-flavor physics via semi-muonic decays with ALICE

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ALICE 实验轻核动量关联研究 (Remote)

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HF/HI/QCD / 165

Measurement of Ωc branching-fraction ratio at ALICE

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Pinning down the origin of collectivity in small systems with ALICE(Remote)

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Probing the nuclear structure with multiparticle correlation in Xe–Xe collisions

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基于 run3 数据的强子-奇异粒子关联研究现状

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HF/HI/QCD / 169

Measurement of inclusive J/Ψ and Ψ(2S) production at midrapidity in pp collisions at 13.6 TeV with ALICE

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Non-prompt J/Ψ production in pp collisions with ALICE

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HF/HI/QCD / 171

Measurement of inclusive J/Ψ polarization at midrapidity in pp collisions at 13.6 TeV with ALICE

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Ξc0 production vs multiplicity via hadronic decay in pp at 13 TeV

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HF/HI/QCD / 173

Study of strange hadron production in jets and the underlying events with ALICE

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ALICE 实验小系统碰撞中集体流研究 (Remote)

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ALICE 实验手征反常效应研究 (Remote)

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Measurement of the prompt and non-prompt J/Ψ production in Pb–Pb collisions at 5.02 TeV with ALICE

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HF/HI/QCD / **177**

Study of jet quenching effects using jet-hadron correlations with ALICE(Remote)

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Study of beauty quark production properties via non-prompt D mesons with ALICE

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New perspectives on UV divergences of loops and the hierarchy problem

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[Cancel] Mono-X Signatures of an Absorbed Fermionic Dark Matter at the LHC

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Search for direct production of electroweakinos in final states with one lepton, jets and missing transverse momentum with the ATLAS detector

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Search for direct production of stau pairs in $\sqrt{s} = 13$ TeV pp collisions with the ATLAS detector

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Search for lepton-flavour violation in high-mass dilepton final states using ATLAS run2 data

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Search for dark photons in rare Z boson decays with the ATLAS detector

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Search for a new Z' gauge boson in the μμν final state with the ATLAS detector

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A search for heavy right-handed Majorana neutrinos with ATLAS

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Progress of the RPC development towards the producition for ATLAS Phase-II upgrade

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CMS-GEM upgrade progress and GEM assembly at Peking University

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CMS-GEM ME0 electronics board design, prototyping and production plan

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CMS iRPC Backend and Trigger status

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Data analsys for iRPC BE/TRG beam test

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Instrumental / 195

Grid computing for LHC experiments in China

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Instrumental / 196

Dark SHINE Simulation software framework

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IHEP ROC Status Report

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Run3 CMS EGamma performance (Remote)

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Instrumental / 199

Optimal transport solutions for pileup mitigation at hadron colliders (Remote)

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Instrumental / 200

Ultimate calibration and performance of the CMS Electromagnetic Calorimeter in LHC Run 2(Remote)

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RPC operation in the ATLAS experiment(Remote)

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Instrumental / 202

Tau trigger scale factor studies

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Instrumental / 203

CMS DQM-DC operations and performance during Run3 data-taking

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Constituent-based W-boson tagging with the ATLAS detector

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Performance of heavy flavour jet identification in boosted topologies with full Run2 data

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Observation of WWγ production

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VBS Wgamma at CMS

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ZZ cross section measurement at 13.6TeV with the ATLAS detector

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Evidence of pair-production of longitudinally polarized vector bosons in ZZ

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Observation of WZy production in pp collicisions with ATLAS detector

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Precise measurement of Z+jets final state and search for neutral triple gauge cou

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Observation and measurement of the cross-sections of the electroweak and total production of a Z pair in association with two jets in pp collisions at √s = 13TeV with the ATLAS detector (remote)

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Observation of Four-Top-Quark Production in the Multi-lepton Final State with the ATLAS Experiment (remote)

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Search for heavy Higgs bosons decaying to atop quark pair with the ATLAS detec

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Searchfor the a new high-mass resonances decaying into Zγ final state in pp collisions at √s = 13 TeV with the ATLAS detector

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Search forleptoquarks decaying into the bτ final state in pp collisions at √s = 13TeVwith the ATLASdetector

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Search for the production of an excited bottom quark decaying to tW (leptonic top + hadronic W) in pp collisions at 13 TeV (CMS)

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TeV / **218**

Search for a new heavy boson W' decaying to a top quark and a bottom qua

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Search for □□□/□ → □□□□ production in a final state 2 with one lepton or two opposite-sign leptons using the full Run 2 □□ collisions data at √□ = 13 TeV

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Observation and differential cross-section measurements of electroweak □□□□ production in □□ collisions at √□ = 13 TeV with the ATLAS detector (Remote)

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Measurements of energy correlators and alphas extraction

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First Direct Observation of Collider Neutrinos with FASER

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Study of isolated photon production with ALICE

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First Results from the Search for Dark Photons with the FASER Detector at the L

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Combination and summary of ATLAS dark matter searches interpreted in the context of 2HDM+a

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b-tagging trigger calibraion with ttbar event

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Improved Asymptotic Formulae for Statistical Interpretation Based on Likelihoo

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Status of Progress of CEPC Calorimeter R&D

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CEPC Flavor Physics

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Silicon detector at the CEPC

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CEPC New Physics Studies

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Electroweak Physics at the CEPC

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Consideration on CEPC Electronics

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“小爆炸”：相对论重离子碰撞

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Performance of ATLAS Photon ID

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Search for Higgs pairs in the bbyy final state with the ATLAS Experiment

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Performance and Calibration of quark/gluon jet tagger and search for new reson

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Test results of Quality Control Test Structure of the USTC-IME LGAD pre-production

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Improvement of jet reconstruction in forward region with time information from HGTD.

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ACP technique for flip chip bonding

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LGAD based Beam monitor development

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Dark Photon search initiative at SHINE facility (Dark SHINE)

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Dark SHINE Simulation software framework

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R&D of Dark SHINE LYSO Crystal ECAL

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R&D of Dark SHINE Strip Tracker

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R&D of Dark SHINE Hadronic Calorimeter (HCAL)

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Development of readout electronics for Dark SHINE ECAL

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Simulation study of the muon flux produced by 1.6 GeV electrons in a beam

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Particle physics opportunities at the Shanghai SHINE facility with secondar

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Development of a muon spin polarization monitor for the J-PARC Muon g-2/EDM experiment

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Muon Lifetime Measurement with Run-1 data of Muon g-2 Experiment at Fermi

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Development of a muon entrance trigger system for the PSI muEDM experiment

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Performance of a prototype PSI muEDM muon entrance detector measured with

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Reconstruction of Neutrino Events in TRIDENT Project based on GNN

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