New directions EXploring the Unknown beyond the Standard Model (NEXUS 2026)

Report of Contributions

https://indico-tdli.sjtu.edu.cn/e/4873

Contribution ID: **1** Type: **not specified**

Specially Embedding a Composite Axion Model

Sunday, 13 September 2026 13:10 (20 minutes)

We present a novel framework of the post-inflationary composite axion to address the strong CP problem without the cosmological domain wall problem. Conventional composite axion models lead to the domain wall number greater than one, producing stable axion domain walls that overclose the Universe. We show that by considering a special embedding of the confining gauge group responsible for the composite axion as well as QCD into a larger product gauge group, the domain wall number is essentially set to unity in the ultraviolet (UV) theory. In this setup, small instanton effects associated with the UV gauge dynamics induce a controlled explicit breaking of the residual discrete symmetry, providing a bias term in the axion potential. As a result, the domain walls become unstable and decay sufficiently quickly, while the axion solution to the strong CP problem remains intact. We construct an explicit realization of this framework, identify a viable parameter region and analyze the axion dark matter abundance. Decays of exotic hadrons from the composite dynamics are also investigated. Our special-embedding UV completion renders the domain wall problem in composite axion models cosmologically harmless.

Primary author: HOR, Shihwen (T. D. Lee Institute)

Presenter: HOR, Shihwen (T. D. Lee Institute)

Session Classification: Parallel talks (3A)

Contribution ID: **2** Type: **Oral Presentation**

Enhanced Cosmic-Ray Cooling in AGN from Dark Matter Deep Inelastic Scattering

Thursday, 10 September 2026 16:40 (20 minutes)

The diffusion of high-energy cosmic rays (CRs) through the dark matter (DM) spikes of active galactic nuclei entails significant energy loss via interactions with DM. While previous studies of sub-GeV DM have focused on elastic scattering, this process becomes insufficient at higher proton energies and DM masses. In this work, we investigate the CR-DM deep inelastic scattering (DIS) as mediated by a vector portal. We calculate the DIS contribution to the CR energy loss rate and derive stringent exclusion limits on the CR-DM scattering cross-section for DM masses between 10^{-6} GeV and 1 GeV. For higher CR energies and mediator masses, the resulting CR cooling timescales are reduced by orders of magnitude after involving the DIS contribution, producing stringent constraints that surpass most of current experimental limits.

Primary authors: MISHRA, Arvind (Nanjing Normal University, China); Dr LU, Chih-Ting (Nanjing Normal University); WU, Lei (Nanjing Normal Univeristy); SU, Liangliang; Ms LI, Linjie (Nanjing Normal University)

Presenter: Dr LU, Chih-Ting (Nanjing Normal University)

Session Classification: Parallel talks (1C)

Contribution ID: **3** Type: **Oral Presentation**

Environmental Paths of Dwarf Galaxies in Self-Interacting Dark Matter with Mass Segregation

Thursday, 10 September 2026 16:20 (20 minutes)

Dwarf galaxies evolve in diverse environments and serve as important probes of dark matter physics and galaxy formation. In this talk, I will present the environmental evolution of dwarf galaxies within a two-component self-interacting dark matter (SIDM) model featuring mass segregation. In this model, energy exchange between heavy and light dark matter particles causes the heavier component to move inward, increasing inner halo densities, accelerating gravothermal evolution, and expanding galaxy sizes. This mechanism naturally addresses the unexpectedly high lensing efficiency of cluster substructures, the ultra-compact dark subhalos inferred from strong lensing, and the enhanced clustering of diffuse dwarf galaxies. To generate predictions across environments, we combine cosmological cold dark matter simulations with a parametric SIDM model. The former captures halo assembly and environmental dependence, while the latter describes SIDM as a controlled deformation of halo evolution paths. Integrating self-interaction effects along these paths enables efficient predictions for both isolated dwarf galaxies and cluster subhalos within a common framework. More generally, the path-deformation perspective motivates a probabilistic extension of the inference framework. We therefore formulate galaxy formation as a stochastic dynamical process and develop a path-measure framework based on hierarchical halo graphs and graph neural networks. This framework provides a natural setting in which environmental effects and SIDM physics can be encoded as controlled deformations of galaxy formation histories.

Primary author: YANG, Daneng (Purple Mountain Observatory, Chinese Academy of Sciences, Nanjing 210023, China)

Presenter: YANG, Daneng (Purple Mountain Observatory, Chinese Academy of Sciences, Nanjing 210023, China)

Session Classification: Parallel talks (1C)

Contribution ID: **4** Type: **Oral Presentation**

Testing the SM and probing new physics via QCD spin effects

Saturday, 12 September 2026 15:00 (30 minutes)

QCD spin effects play a crucial role in probing nuclear structures and have been extensively studied in hadronic physics. However, their potential for exploring new physics beyond the Standard Model and quantum entanglement phenomena has been largely overlooked. In this talk, I will discuss how transverse spin effects—encoded in quark fragmentation functions—can probe electroweak dipole interactions of light quarks, which are otherwise challenging to access due to their chirality-flipping nature in traditional searches at the LHC and other facilities.
Additionally, while quantum entanglement has been observed in top-quark pairs at the LHC, extending such studies to light-quark systems remains a challenge, as conventional methods rely on perturbative decays of massive particles. I will present new approaches to investigate entanglement and test Bell inequality violations in light-quark pairs using QCD transverse spin correlations.

Primary author: Prof. YAN, Bin (IHEP)

Presenter: Prof. YAN, Bin (IHEP)

Session Classification: Plenary talks (3)

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

Reviving primordial black hole formation in slow first-order phase transitions

Friday, 11 September 2026 10:30 (30 minutes)

Large curvature perturbations generated during slow first-order phase transitions are a promising source of primordial black holes. However, recent analyses suggested that the mechanism is ruled out once the density contrast and the formation threshold are evaluated in the same gauge. In this work, we show that this mechanism remains viable: after a supercooled transition, reheating can be sufficiently slow that the Universe enters an early matter-dominated era, during which even small overdensities grow and collapse into primordial black holes.

Primary author: Prof. XIE, Ke-Pan (Beihang University)

Presenter: Prof. XIE, Ke-Pan (Beihang University)

Session Classification: Plenary talks (2)

Contribution ID: **6** Type: **Oral Presentation**

WIMP Meets ALP: Coherent Freeze-Out of Dark Matter

Saturday, 12 September 2026 16:20 (20 minutes)

The microscopic nature of dark matter is the major open question in science. Weakly-Interacting Massive Particles (WIMPs) and Axion-Like Particles (ALPs) are the two most theoretically motivated dark matter candidates. Thousands of papers consider them separately. We point out that if both species are present in the theory, even a tiny (Planck-suppressed) interaction between them could lead to drastic modifications of their dynamics in the early universe.

Specifically, we consider the cosmological history of a fermionic WIMP coupled to a light ALP via a quadratic coupling. Although the coupling is too feeble to thermalize the ALP, coherent forward scattering between the two sectors induces temperature-dependent mass shifts that substantially modify both WIMP freeze-out and ALP misalignment dynamics, giving rise to a novel coherent freeze-out mechanism. At high temperatures, the WIMP thermal bath spontaneously breaks the symmetry of the ALP potential, displacing the field to a new vacuum. The resulting back-reaction reduces the WIMP effective mass and significantly delays its freeze-out. Depending on the strength of the coupling, symmetry restoration occurs via either a first-order phase transition (FOPT) or a crossover. In the FOPT regime, dark matter consists solely of WIMPs, whose delayed freeze-out permits annihilation cross sections up to three orders of magnitude above the standard value, while still yielding the correct relic density. In the crossover regime, both WIMP and ALP can contribute to dark matter. Remarkably, we find an "ALP miracle": a Planck-suppressed quadratic coupling yields an ALP abundance comparable to the observed dark matter density, largely independent of its initial displacement and mass.

Primary author: Dr YU, Bingrong (Cornell University)

Co-authors: Prof. PERELSTEIN, Maxim (Cornell University); Dr FERRANTE, Steven (Cornell University)

Presenter: Dr YU, Bingrong (Cornell University)

Session Classification: Parallel talks (2B)

Contribution ID: **7** Type: **Oral Presentation**

The price for monopole dark matter

Sunday, 13 September 2026 16:20 (30 minutes)

Dark matter could consist mainly of magnetic monopoles of a dark non-abelian gauge group. These dark monopoles could be produced during a thermal phase transition in the early Universe. We show that, in a minimal model and with quite general assumptions, this scenario cannot be realized, since the dark matter abundance is always dominated by dark gauge bosons. In a non-minimal extension of the model with a light dark fermion, monopoles can be dark matter, but such models are quite constrained as they predict extra dark radiation. Talk based on 2509.21924 and work in progress with Giacomo Ferrante, Théodore Fischer and Michele Frigerio.

Primary author: BRÜMMER, Felix (LUPM Montpellier, France)

Presenter: BRÜMMER, Felix (LUPM Montpellier, France)

Session Classification: Plenary talks (4)

Contribution ID: **8** Type: **Oral Presentation**

Detecting RG-stable relations in multi-Higgs models

Sunday, 13 September 2026 10:50 (30 minutes)

It is well known that unbroken global symmetries of the lagrangian remain unbroken under RG evolution. Less appreciated is the fact that certain relations can be RG-stable even without any symmetry transformation of the field content of the model. Recently, a renewed interest in this topic was sparked by the observation of a family of all-order RG-stable relations in the 2HDM scalar sector that cannot be generated by any usual symmetry. At present, opinions differ on how to understand this feature. It is also not known how to systematically discover such situations in other multi-Higgs models. In this talk, I will report a pragmatic numerical strategy that helps us identify such relations in a generic multi-scalar model, at least to one loop.

Primary author: Prof. IVANOV, Igor (Sun Yat-sen University)

Presenter: Prof. IVANOV, Igor (Sun Yat-sen University)

Session Classification: Plenary talks (4)

Contribution ID: **9** Type: **Oral Presentation**

Correlative study of flavor anomalies and dark matter in the light of scalar leptoquark

Sunday, 13 September 2026 14:10 (20 minutes)

We explore $U(1)_{L_e-L_\mu}$ gauge extension of the Standard Model with particle content enlarged by three neutral fermions, of which the lightest one contributes to dark matter content of the Universe. The scalar sector is enriched with a $\tilde{R}_2$ scalar leptoquark doublet to investigate flavor anomalies in B-meson sector and a scalar singlet to spontaneously break the new $U(1)$. We discuss dark matter relic density and direct detection cross section in scalar and gauge portals.
On the other hand, the new physics contribution for $b \to s$ transition comes from penguin diagrams with Z', leptoquark and new fermions. We analyze the constraints on the model parameters from the established observables of $B \to K^{(*)}\mu^+\mu^-$ and $B_s \to \phi\mu^+\mu^-$ decay channels. Utilizing the permissible parameter space consistent with both flavor and dark sectors, we discuss the impact on various observables such as branching ratio, forward-backward asymmetry and longitudinal polarisation asymmetry of $\Lambda_b \to \Lambda^*(1520)(\to pK)\ell^+\ell^-$ decay channel.

Primary author: PANDA, DHIREN (University of Hyderabad)

Presenter: PANDA, DHIREN (University of Hyderabad)

Session Classification: Parallel talks (3C)

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

Revisiting $\mu - e$ conversion in R-parity violating SUSY

Sunday, 13 September 2026 13:50 (20 minutes)

The lepton-flavor-violating(LFV) interactions are extremely suppressed in Standerd Model, making this process an excellent way to explore new physics. In this work, we revisit the LFV interactions in R-parity violating SUSY model, with renormalization group running effects(RGEs) from high to low energy scales. The LFV processes $\mu - e$ conversion, $\mu \to e\gamma$ and $\mu \to 3e$ impose upper limits on the 15 combinations of $|\lambda'_{ijk}\lambda'^{*}_{mnk}|$ and 6 combinations of $|\lambda_{ijk}\lambda_{mnk}|$ for trilinear RPV couplings. In certain cases, the RGEs can improve the constraints by $\sim 80\%$. In the near future, the $\mu - e$ conversion experiments will provide the most stringent constraints, which may provide a crucial way to examine the underlying new physics.

Primary authors: HE, Xiao-Gang; ZHANG, Rong-Rong (TDLI)

Presenter: ZHANG, Rong-Rong (TDLI)

Session Classification: Parallel talks (3B)

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

Freeze-in $SU(2)$ vector dark matter at low reheating temperature

Sunday, 13 September 2026 14:10 (20 minutes)

The freeze-in mechanism for dark matter (DM) requires extremely feeble interactions with the Standard Model (SM), preventing thermal equilibrium in the early Universe and typically evading experimental detection. However, for sufficiently low reheating temperatures ($T_{\rm RH}$), the observed relic abundance can be realized with larger couplings, opening prospects for experimental searches. In this work, we investigate freeze-in production of $SU(2)_{\rm HS}$ vector dark matter (VDM) in a low-$T_{\rm RH}$ cosmology. The framework naturally contains three mass-degenerate stable VDM candidates without the need for any additional discrete symmetry. We perform a systematic study of the dark matter phenomenology and identify the parameter space consistent with the observed relic abundance. In contrast to conventional freeze-in scenarios, the required DM couplings can be sizable, rendering part of the parameter space already constrained by existing direct searches like PandaX-4T and LZ, while a significant region remains within the reach of future experiments such as DARWIN. Though one can realize the freeze-in mechanism for an abelian $U(1)_X$ vector DM models as well, we find that the non-abelian structure of the $SU(2)_{\rm HS}$ scenario leads to a distinct feature due to a larger number of dark matter particles, resulting in an enlarged viable parameter space due to the multiplicity of dark matter states.

Primary authors: Prof. GHOSH, Dilip Kumar; Mr GOPE, Sourav; Prof. HE, Xiao-Gang; HONG, Xuan; JEESUN, Sk

Presenter: HONG, Xuan

Session Classification: Parallel talks (3B)

Contribution ID: **12** Type: **Oral Presentation**

Phantom crossing from the Standard Model and General Relativity

Thursday, 10 September 2026 16:20 (20 minutes)

Suggestions of a late-time phantom crossing from DESI baryon acoustic oscillation measurements, combined with cosmic microwave background and Type-Ia supernova observations, have renewed interest in non-standard dark energy models. In this Letter, we propose a new realization of a low redshift phantom crossing using only well understood ingredients from fermion condensation and general relativity. Our construction relies on the interplay between effective quintom-like dark energy and backreaction from non-linear structure formation. The full cosmological evolution is consistent with ΛCDM until low redshift, where the backreaction starts to become prominent and a phase transition occurs. At this point, the total dark energy equation of state first crosses $w_{\rm DE} = -1$ from above. For benchmark values of the backreaction energy density, a second crossing from below occurs at a lower redshift, as suggested by recent observation. Fitting our theoretical model with CPL parametrization, we find the result is consistent with the combined DESI+CMB+SNIa data analysis with DESY5, PantheonPlus, and Union3 datasets. Specifically, for backreaction density parameter $\Omega_{\rm BR}(z = 0) = 0.0572$, the CPL parametrization gives the phantom crossing redshift $z_* \simeq 0.35$, $w_0 \simeq -0.76$ and $w_a \simeq -0.93$.

Primary author: MARCIANO, Antonino (Fudan University and INFN Frascati)

Presenter: MARCIANO, Antonino (Fudan University and INFN Frascati)

Session Classification: Parallel talks (1A)

Contribution ID: **13** Type: **Oral Presentation**

Combination of ATLAS and CMS searches for Higgs boson pair production at √s = 13 TeV

Sunday, 13 September 2026 13:30 (20 minutes)

arXiv:2602.23991 (**Accetped by PRL**)
We presents a combination of searches for Higgs boson pair (HH) production performed by the ATLAS and CMS Collaborations using proton-proton collision data sets recorded at √s = 13 TeV during the Large Hadron Collider Run 2, corresponding to integrated luminosities ranging between 126 and 140 fb^{-1}. The upper limit at the 95% confidence level on the total HH signal strength, defined as the ratio of the measured cross section to the SM prediction, corresponds to 2.5, with an expected value of 1.7 (2.8) assuming the absence (presence) of the standard model (SM) HH signal. The strength of the HH signal is measured to be $0.8^{+0.9}_{-0.7}$ relative to the SM prediction. The observed significance is found to be 1.1 standard deviations whereas 1.3 are expected for the SM HH signal. Constraints are set on the Higgs boson trilinear self-coupling and on the couplings of two Higgs bosons to two vector bosons, both normalized to the SM predictions and denoted as and $_{2V}$, respectively. The observed individual constraints at the 95% confidence level are −0.71<<6.1 and 0.73<$_{2V}$<1.3, while the expected constraints assuming the presence of the SM HH signal are −1.3<<6.7 and 0.66<$_{2V}$<1.4.

Primary author: ZHOU, Baihong (TDLI, SJTU)

Presenter: ZHOU, Baihong (TDLI, SJTU)

Session Classification: Parallel talks (3C)

Contribution ID: **15** Type: **Oral Presentation**

New physics opportunities with DarkSHINE initiative

Sunday, 13 September 2026 13:10 (20 minutes)

This talk will present the latest phenomenological and simulated experimental prospective studies on the new physics opportunities at DarkSHINE Experiment by exploring the physics sensitivity of searching for dark fermions/sterile neutrinos and utilizing the positron beam mode to search for Dark Photon invisible decay signals in comparison with electron beam mode sensitivities.

Primary author: ZHU, Xuliang (TDLI, SJTU)

Presenter: ZHU, Xuliang (TDLI, SJTU)

Session Classification: Parallel talks (3C)

Contribution ID: **16** Type: **Oral Presentation**

Background-Induced Forces from Quadratically Coupled Ultralight Dark Matter

Saturday, 12 September 2026 17:00 (20 minutes)

Quadratically coupled ultralight scalar dark matter behaves as a coherent classical field whose interactions with matter can induce a composition-dependent force through the dark matter background. We present a complete calculation of this background-induced force beyond the spherically symmetric approximation. Using a partial-wave treatment of dark-matter scattering, we determine its angular dependence and derive an analytic description valid even when the dark-matter wavelength is much smaller than the Earth's radius. We show for the first time that Earth screening generates a characteristic frequency-band structure, splitting the signal into multiple sidebands that provide a distinctive experimental signature. We further show that the relative amplitudes of these sidebands vary annually due to the Earth's motion through the dark-matter halo, enabling the construction of a complete signal template. As an application of these results, we re-evaluate constraints from the MICROSCOPE mission, which currently provides the strongest laboratory limits on equivalence-principle violations from ultralight dark matter. We further show that proposed space-based equivalence-principle experiments, such as Galileo Galilei and STE-QUEST, can significantly enhance their sensitivity to ultralight scalar dark matter by incorporating the full frequency-band information.

Primary authors: XU, Hailin (Tsung-Dao Lee Institute); Dr BOULEY, Thomas; Prof. YU, Tien-Tien (University of Oregon); Dr GAN, Xucheng (DESY)

Presenter: XU, Hailin (Tsung-Dao Lee Institute)

Session Classification: Parallel talks (2C)

Contribution ID: **17** Type: **Oral Presentation**

Measurement of the Higgs boson decay to a low-mass dilepton system and a photon in pp collisions at $\sqrt{s}$ = 13 and 13.6 TeV with the ATLAS detector

Sunday, 13 September 2026 13:50 (20 minutes)

arxiv:2608.03369 (submitted to JHEP)
A measurement of the $H \to \gamma^*\gamma$ process in the $\ell\ell\gamma$ final state is performed using proton–proton collision data recorded with the ATLAS detector at $\sqrt{s}$ = 13.6 TeV during the years 2022–2024, corresponding to an integrated luminosity of 164 fb^{-1}. A simultaneous unbinned maximum-likelihood fit to the reconstructed invariant mass across all event categories gives an observed (expected) signal yield normalized to the SM prediction, $\mu = 0.64^{+0.44}_{-0.39}$ ($\mu = 1.00^{+0.47}_{-0.41}$). This corresponds to an observed (expected) signal significance of 1.7 (2.5) standard deviations. This measurement is further combined with the Run-2 result, improving the precision and sensitivity of the $H \to \gamma^*\gamma$ measurement. In the combined fit, the observed (expected) signal yield normalised to the SM prediction is $\mu = 1.03^{+0.35}_{-0.32}$ ($\mu = 1.00^{+0.34}_{-0.32}$), corresponding to an observed (expected) signal significance of 3.4 (3.3) standard deviations.

Primary author: TARTARIN, Matthias (TDLI/SJTU)

Presenter: TARTARIN, Matthias (TDLI/SJTU)

Session Classification: Parallel talks (3C)

Contribution ID: **18** Type: **Oral Presentation**

3-form dark energy and cosmic birefringence

Sunday, 13 September 2026 11:20 (30 minutes)

3-form dark energy is similar to but distinguishable from a scalar field in an expanding universe, and its tensorial structure allows for unique couplings that cannot be experienced by canonical scalars. We here explore the possibility that 3-form dark energy can explain the cosmic birefringence angle $\beta \sim 0.3°$, as suggested by observations of the CMB polarization. We consider two EFT-inspired couplings between the 3-form and the photon, finding a dimension-4 operator is a candidate explanation, moreover predicting a photon mass around the Hubble scale. The profiles for $\beta(z)$ from the model can mimic those from ALP dark energy or ALP dark matter, or be distinguishable, depending on the field configuration in the early universe.

Primary authors: KAMADA, Kohei (HIAS UCAS); MANTON, Tucker (HIAS UCAS)

Presenter: MANTON, Tucker (HIAS UCAS)

Session Classification: Plenary talks (4)

Contribution ID: **19** Type: **Oral Presentation**

The Inflationary Schwinger Effect and Dark Matter

Thursday, 10 September 2026 13:40 (30 minutes)

In this talk I will review aspects of the inflationary Schwinger effect and its implications for dark matter. As part of this I will review the calculation of the Schwinger current in de Sitter space and show how peculiar IR divergences found in previous calculations can be cured. I will then review how the dark matter relic abundance can be generated through the inflationary Schwinger effect leading to a combination of vector and dark charged fermion or scalar dark matter today and discuss potential phenomenological implications.

Primary author: VEGA-MORALES, Roberto (University of Granada)

Presenter: VEGA-MORALES, Roberto (University of Granada)

Session Classification: Plenary talks (1)

Contribution ID: **20** Type: **Oral Presentation**

Formation and Dynamics of Multi-Vacuum Domains from Axion Fragmentation

Axion-like fields with tilted periodic potentials can contain multiple metastable minima. I will discuss how resonant amplification of axion fluctuations can fragment an initially homogeneous field, causing different regions to settle into different vacua without tunneling. Using 3D lattice simulations in an expanding universe, we study the formation, expansion, and collision of these vacuum domains, and show that relativistic collisions can trigger cascades toward lower-energy vacua. This connects axion fragmentation with classical vacuum transitions and may have implications for relaxion models, axion monodromy, and early-universe vacuum selection.

Primary authors: FAN, Qiqi; JIANG, Yun

Presenter: JIANG, Yun

Session Classification: Parallel talks (2B)

Contribution ID: **21** Type: **Oral Presentation**

Sphalerogenesis

Saturday, 12 September 2026 16:20 (20 minutes)

In this talk, I discuss a new scenario that explains the baryon asymmetry of the Universe through a minimal extension of the Standard Model (SM). In this scenario, all three Sakharov conditions are simultaneously satisfied during the decoupling of CP-violating electroweak (EW) sphaleron processes. As the source of the CP asymmetry in the EW sphaleron process, we consider an effective theory in which a CP-violating dimension-six operator is added to the SM. We show that this scenario can be tested by near-future measurements of the electron electric dipole moment. We also demonstrate that a model containing additional EW-multiplet fermions with CP-violating Yukawa interactions provides a possible ultraviolet completion of this scenario. This talk is based on arXiv:2505.09984 and arXiv:2604.00649.

Primary author: TANAKA, Masanori (Peking University)

Co-author: OGAWA, Kiyoto (Nagoya University)

Presenter: TANAKA, Masanori (Peking University)

Session Classification: Parallel talks (2A)

Contribution ID: **22** Type: **Oral Presentation**

Solar neutrinos in Direct Detection as probes of new physics

Thursday, 10 September 2026 16:20 (20 minutes)

With observations of solar neutrinos in direct dark matter detection, the search for dark matter is beginning to fog. This irreducible neutrino fog presents an new probe into neutrino physics. In this talk, we explore the potential of current and next-generation xenon-based detectors to constrain and discover non-standard neutrino interactions (NSI). We present new limits on NSI couplings and introduce a re-parametrisation of the framework that clarifies the complementarity between different experimental probes, showing that direct detection experiments are rapidly approaching the sensitivity of dedicated neutrino facilities.

Primary author: CHEEK, Andrew (TDLI, SJTU)

Presenter: CHEEK, Andrew (TDLI, SJTU)

Session Classification: Parallel talks (1B)

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

Novel signature of axion-like particles at neutrino experiments

Friday, 11 September 2026 15:20 (30 minutes)

Novel signature of axion-like particles at neutrino experiments

Primary author: SONG, Ningqiang (Institute of Theoretical Physics, Chinese Academy of Sciences)

Presenter: SONG, Ningqiang (Institute of Theoretical Physics, Chinese Academy of Sciences)

Session Classification: Plenary talks (2)

Contribution ID: **24** Type: **Oral Presentation**

Earth rotation turns event timing into a geometric probe of UHE neutrino origin

Thursday, 10 September 2026 16:40 (20 minutes)

The ultra-high-energy event KM3–230213A has been attributed to dark matter (DM) decay, despite arriving opposite the Galactic Centre. We construct a per-event test statistic to quantify this hypothesis and forecast the events needed to exclude it in favour of an isotropic signal. The single observed event disfavours but does not exclude DM decay ($p_{\rm DM} \simeq 0.13$–0.15). Including time-averaged detector visibility lowers the required sample from $\sim$33–43 to $\sim$22–27 events, and a fully time-resolved treatment to $\sim$14–16. Event timing thus probes signal geometry robustly across decay channels and halo profiles, for any equatorial UHE neutrino telescope.

Primary authors: CHEEK, Andrew (TDLI, SJTU); PINHEIRO, Joao Paulo (TDLI)

Presenter: PINHEIRO, Joao Paulo (TDLI)

Session Classification: Parallel talks (1B)

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

Constraining axion quadratic couplings with the Hulse-Taylor binary system

Saturday, 12 September 2026 17:20 (20 minutes)

The orbital evolution of the Hulse-Taylor binary neutron star system is described with high precision by General Relativity, in which gravity is the only long-range force and gravitational waves provide the dominant energy-loss channel. We use this precision test of relativistic binary dynamics to derive new constraints on axion couplings to stable neutron-star constituents: neutrons, electrons, and muons. In the presence of exotic long-range forces and additional radiation channels, the measured orbital decay constrains the strength of quadratic axion-fermion interactions. Axions enjoy a perturbative shift symmetry that is broken by non-perturbative effects responsible for the axion mass. Such shift symmetry breaking can induce quadratic couplings between axions and fermions. In an ambient axion dark-matter background, these couplings mediate enhanced long-range, spin-independent forces, while also allowing binary systems to lose energy through dipole and quadrupole emission of axion waves. For light QCD axions and for models in which non-perturbative effects correct lepton masses, our bounds can be recast as limits on the axion decay constant.

Primary author: 尹, 孜文 (上海交通大学物理与天文学院（李政道研究所）)

Co-authors: Prof. MARSH, David (King's College London); Prof. FAIRBAIRN, Malcolm (King's College London); Dr BALAJI, Shyam (King's College London)

Presenter: 尹, 孜文 (上海交通大学物理与天文学院（李政道研究所）)

Session Classification: Parallel talks (2C)

Contribution ID: **26** Type: **Oral Presentation**

Dark Matter Inelastic Scattering with Nuclei

Sunday, 13 September 2026 13:30 (20 minutes)

The talk is devoted to the role of excited final nuclear states in WIMP-nucleus scattering. We generalize the formalism of non-relativistic effective field theory to inelastic scattering and apply the state-of-the-art Relativistic Configuration-interaction Density functional theory to evaluate the event rates in direct detection experiments. We show that for certain interaction operators, the expected signal is significantly enhanced, by 1-3 orders of magnitude, if one takes the contribution of inelastic channel into account.

Primary authors: Dr TITOV, Oleg (TDLI-SJTU); Prof. GE, Shao-Feng (TDLI-SJTU); Dr WANG, Yakun (Beihang University)

Presenter: Dr TITOV, Oleg (TDLI-SJTU)

Session Classification: Parallel talks (3B)

Contribution ID: **27** Type: **Oral Presentation**

Defect-Mediated Conversion: Dark Matter from Cosmological Domain-Wall Scattering

Saturday, 12 September 2026 17:00 (20 minutes)

We propose a new mechanism for dark matter genesis, Defect-Mediated Conversion (DMC). Cosmological domain walls–generic remnants of spontaneously broken discrete symmetries–can host a scalar condensate in their core that acts as a portal between the Standard Model and a dark sector: thermal-bath fermions crossing the wall are partially and non-thermally converted into dark particles. The mechanism can yield the correct abundance of dark matter for a large mass range from the keV Lyman-α floor and up to orders of magnitude above the wall formation scale and is more efficient than standard Freeze-In mechanism for the same Yukawa couplings.

Primary authors: Dr PINHEIRO, João Paulo (Tsung-Dao Lee Institute, Shanghai Jiao Tong University); SASSI, Mohamed Younes (Tsung-Dao Lee Institute, Shanghai Jiao Tong University)

Presenter: SASSI, Mohamed Younes (Tsung-Dao Lee Institute, Shanghai Jiao Tong University)

Session Classification: Parallel talks (2B)

Contribution ID: **28** Type: **Oral Presentation**

Galactic Center gamma-ray excess from a generic triaxial halo

Thursday, 10 September 2026 17:00 (20 minutes)

Recent studies of Galactic surveys, such as Gaia, have revealed that the Milky Way's gravitational potential comes from a matter distribution that is triaxial and rotated with respect to the Galactic center-Sun axis. This, in turn, could mean that the dark matter halo also shares these properties. In this talk, I will discuss e.g. the compatibility of the morphology of the Galactic Center excess from dark matter annihilation with a triaxial dark matter halo. In particular, we consider both untilted triaxial halos and halos whose principal axes are tilted with respect to the Galactic disk. In our fits of the Fermi-LAT data, by testing over a large library of galactic diffuse emission models, we quantify how the halo triaxiality and tilt affect the line-of-sight-integrated annihilation signal and, consequently, the preferred GCE spatial templates. We find that the GCE spectrum and inner cuspiness are robust against variations in the triaxiality and tilt of the dark matter halo. However, in terms of its overall morphology, the GCE in the gamma-ray data can discriminate between choices for the dark matter halo's triaxiality and tilt. Finally, we find that the GCE is more compatible with originating from a triaxial and tilted halo of dark matter than originating from a triaxial and tilted halo of stars, a result important for understanding the GCE's origin.

Primary author: HU, Leo Qiyuan (City University of Hong Kong)

Co-authors: Prof. CHOLIS, Ilias (Oakland University); ZHONG, Yiming

Presenter: HU, Leo Qiyuan (City University of Hong Kong)

Session Classification: Parallel talks (1C)

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

Light long lived particle searches

Sunday, 13 September 2026 14:50 (30 minutes)

Recent years, the intensity frontier of physics beyond the Standard model attracts more and more attentions. Thus light long lived particles searches becomes critical, and the various new machines like FASER, ShiP, Mathusla are built up or proposed. In this talk we study the prospect of detecting light long-lived Higgs at these machines. We develop the general formalism for the scalar production and decay from mesons at LHC, given modified couplings of the scalars to the SM particles, as well as summarizing the relevant GeV-scale experiment constraints. We then analyze the light scalars in the framework of the Type-I 2HDM and MSSM. We finally try to figure out how to detect LLPs beyond the typical limit of FASER detector.

Primary author: SU, Wei (SYSU)

Presenter: SU, Wei (SYSU)

Session Classification: Plenary talks (4)

Contribution ID: **30** Type: **Oral Presentation**

Scaling solutions for gauge invariant flow equations in dilaton quantum gravity

Thursday, 10 September 2026 16:40 (20 minutes)

We discuss the ultraviolet fixed point of asymptotically safe dilaton quantum gravity. It differs from the Reuter fixed point by the dependence of the Planck mass on a scalar field. The gauge invariant functional flow equation in the most general approximation with up to two derivatives strengthens the argument for the existence of this fixed point. The quantum effective action obtained from the scaling solution for dilaton quantum gravity can describe inflation for early cosmology and dynamical dark energy for late cosmology.

Primary authors: MAITINIYAZI, Yadikaer (JiLin University); Prof. WETTERICH, Christof (Institut für Theoretische Physik, Universität Heidelberg); Prof. YAMADA, Masatoshi (Kwansei Gakuin University)

Presenter: MAITINIYAZI, Yadikaer (JiLin University)

Session Classification: Parallel talks (1A)

Contribution ID: **31** Type: **Oral Presentation**

First-order phase transitions, primordial black holes, scalar-induced gravitational waves, and sound-wave gravitational waves from early Universe

Friday, 11 September 2026 11:00 (30 minutes)

In this talk, I first introduce the hydrodynamic sound-shell model for gravitational waves from sound waves of first-order phase transitions, then we investigate the primordial black hole formations from the delayed-decay regions of first-order phase transitions, next we study the scalar-induced gravitational waves with non-Gaussianity up to all orders, and finally we propose sound-wave gravitational waves from primordial gravitational instability and its relation to the scalar-induced gravitational waves.

Primary author: WANG, Shao-Jiang (Institute of Theoretical Physics, Chinese Academy of Sciences)

Presenter: WANG, Shao-Jiang (Institute of Theoretical Physics, Chinese Academy of Sciences)

Session Classification: Plenary talks (2)

Contribution ID: **32** Type: **Poster Presentation**

Quantum Fisher Information and Quantum-State Distinguishability in Neutrino Oscillation Parameter Estimation

Thursday, 10 September 2026 17:20 (20 minutes)

Determining the leptonic CP-violating phase δ_{CP}, the atmospheric mixing angle θ_{23}, and the mass-squared difference Δm^2_{31} with high precision is a central goal of current and next-generation long-baseline neutrino experiments. In this work, we investigate the fundamental information content of three-flavor neutrino oscillations within the framework of quantum estimation theory. Treating the propagating neutrino as an evolving pure quantum state, we analyze the quantum Fisher information (QFI) and the quantum Fisher information matrix (QFIM) associated with θ_{23}, δ_{CP}, and Δm^2_{31}. We study the dependence of the QFI on the baseline-to-energy ratio L/E, revealing distinct sensitivity structures for the three oscillation parameters, and examine the role of parameter correlations in determining the multiparameter quantum Cramér–Rao bound. We further investigate parameter degeneracies in neutrino oscillation probabilities and demonstrate that probability-degenerate parameter sets need not correspond to indistinguishable quantum states. Using quantum fidelity, we identify distinct quantum-state characteristics among degenerate (θ_{23}, δ_{CP}) solutions that remain inaccessible at the probability level. Our results highlight quantum estimation theory as a complementary framework for assessing the ultimate precision of neutrino oscillation measurements and for uncovering quantum information hidden by probability-based analyses.

Primary author: Dr YADAV, Bhavna (Wilczek Quantum Center, SIAS, USTC)

Co-authors: Dr SUBBA, Amir (Wilczek Quantum Center, SIAS, USTC); Prof. SHI, Yu (Wilczek Quantum Center, SIAS, USTC)

Presenter: Dr YADAV, Bhavna (Wilczek Quantum Center, SIAS, USTC)

Session Classification: Parallel talks (1B)

Contribution ID: **33** Type: **Oral Presentation**

Ultraviolet-Sensitive Axion Potentials from Small Instantons

Sunday, 13 September 2026 13:50 (20 minutes)

Small instantons can significantly modify the axion potential in KSVZ models containing vector-like quarks (VQs). Using naive dimensional analysis, we analyse models with a single VQ, multiple identical copies, and sets of distinct VQs, while requiring the gauge couplings to remain perturbative up to the Planck scale under two-loop running. Their differing fermion zero-mode structures require suitable combinations of mass insertions and scalar–Yukawa contractions for saturation. With sufficiently many VQs, the instanton-size integral can become dominated by the smallest instantons, rendering the induced potential sensitive to ultraviolet physics and potentially comparable to, or larger than, the ordinary QCD contribution. With the aligned QCD and small-instanton potentials, this enhances the physical axion mass at fixed (f_a), while (g_{a\gamma\gamma}) remains controlled by (f_a) and the anomaly ratio (E/N). The standard QCD relation among (m_a), (f_a), and (g_{a\gamma\gamma}) is therefore modified, opening new regions of axion parameter space.

Primary authors: SHUKLA, Saurabh K (Nankai University); CHEN, ning (Nankai University)

Presenter: SHUKLA, Saurabh K (Nankai University)

Session Classification: Parallel talks (3A)

Contribution ID: **34** Type: **Oral Presentation**

Implications of a μeV axion discovery

Thursday, 10 September 2026 15:00 (30 minutes)

The QCD axion provides a compelling solution to the strong-CP problem and a leading dark-matter candidate. Its relic abundance depends on the epoch of Peccei–Quinn symmetry breaking and the thermal history of the early Universe. This talk examines how axion dark matter can populate the 0.49–1.49 μeV mass window targeted by haloscopes in Frascati National Laboratories. Although standard post-inflationary predictions generally favour larger masses, this range is compatible with pre-inflationary misalignment and can also arise from late entropy production or modified axion mass–decay-constant relations. A signal revealed in a haloscope would probe both axion microphysics and otherwise inaccessible pre-BBN cosmology.

Primary author: Prof. VISINELLI, Luca (University of Salerno & INFN)

Presenter: Prof. VISINELLI, Luca (University of Salerno & INFN)

Session Classification: Plenary talks (1)

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

Direct detection and cosmological constraints of dark matter with dark dipoles

Saturday, 12 September 2026 17:20 (20 minutes)

We study a fermionic dark matter candidate that couples to the standard model particles exclusively through electric and magnetic dipole operators mediated by a massive dark photon. Such dipole portals naturally arise in dark sectors where the dark matter is neutral under a hidden U(1)D, and they lead to phenomenology distinct from conventional vector-current interactions. We consider the direct-detection signals arising from dark matter-nucleus scattering including the Migdal effect, dark matter-electron scattering, and semiconductor targets, which allow sensitivity to sub-GeV dark matter masses, together with the cosmological bounds from such as thermal relic abundance, cosmic microwave background, big-bang nucleosynthesis, and cosmic-rays. We find that the dark dipole coupling can be largely constrained by direct detection (in particular, electric dipole coupling). However, the cosmological observations have already constrained most of the parameter space, in particular for magnetic dipole interactions of U(1)D for sub-GeV dark matter. For the dark matter mass below 10 MeV, the semiconductor experiments can play a crucial role in probing the dark dipole interactions: future low-threshold experiments utilizing the semiconductor targets can further extend the constraints. Our results have demonstrated that the sub-GeV dark matter with dark dipole interactions can be still safe from the direct-detection constraints, and the future low-threshold semiconductor experiments may play a significant role in constraining the dark dipole interactions.

Primary authors: WANG, Jun-Chen (Peking University); KUWAHARA, Takumi (Jilin U); SHU-RUN, Yuan

Presenter: KUWAHARA, Takumi (Jilin U)

Session Classification: Parallel talks (2B)

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

The lattice simulation method of SIGW

Saturday, 12 September 2026 16:20 (20 minutes)

Scalar-induced gravitational waves (SIGW) are one of the most promising GW sources of the early universe. The particle interactions, on the one hand, could change the equation of state ω and the sound speed c_s of the cosmic fluid, such as during the QCD crossover; on the other hand, they can also contribute an anisotropic stress to the energy-momentum tensor. Recently, we have proposed a lattice simulation method to compute the SIGW, and I will show that this method can reproduce the known results, including the particle interactions. Since this method can easily be extended to cases with non-Gaussianity, it will help us to give a more precise GW signal and better constraints on PBH abundance.

Primary author: ZENG, Xiang-Xi (TDLI)

Presenter: ZENG, Xiang-Xi (TDLI)

Session Classification: Parallel talks (2C)

Contribution ID: **37** Type: **Oral Presentation**

Modular invariant Inflation and reheating

Thursday, 10 September 2026 17:00 (20 minutes)

We use modular symmetry as an organizing principle that attempts to simultaneously address the lepton flavor puzzle, inflation, and post-inflationary reheating. We demonstrate this approach using the finite modular group A_4 in the lepton sector. In our model, neutrino masses are generated via the Type-I see-saw mechanism, with modular symmetry dictating the form of the Yukawa couplings and right-handed neutrino masses. The modular field also drives inflation, providing an excellent fit to recent Cosmic Microwave Background (CMB) observations. The corresponding prediction for the tensor-to-scalar ratio is very small, $r \sim \mathcal{O}(10^{-7})$, while the prediction for the running of the spectral index, $\alpha \sim -\mathcal{O}(10^{-3})$, could be tested in the near future. An appealing feature of the setup is that the inflaton-matter interactions required for reheating naturally arise from the expansion of relevant modular forms. Although the corresponding inflaton decay rates are suppressed by the Planck scale, the reheating temperature can still be high enough to ensure successful Big Bang nucleosynthesis.

Primary author: 赵, 文斌 (中国科学院大学)

Presenter: 赵, 文斌 (中国科学院大学)

Session Classification: Parallel talks (1A)

Contribution ID: **38** Type: **Oral Presentation**

Bubble Wall Velocity in the Electroweak Phase Transition of the New Physics Model

Saturday, 12 September 2026 17:00 (20 minutes)

The bubble wall velocity is a key parameter in cosmological first-order phase transitions, affecting both electroweak baryogenesis and gravitational-wave signals. However, it is often treated as an external input in phenomenological studies, while a self-consistent determination remains challenging. In this work, we investigate the bubble wall dynamics in the New Physics Model. The microscopic friction arising from particle interactions with the plasma is evaluated using Boltzmann transport equations, while the macroscopic plasma response is described through hydrodynamic analysis. By applying the steady-state force-balance condition, we numerically determine the bubble wall velocity for different model parameters. We show that the wall velocity is governed by the competition between the driving force from the effective potential and plasma friction, and that its variation can significantly affect the baryon asymmetry. Our study provides a quantitative investigation of bubble wall dynamics in cosmological phase transitions and its implications for early-Universe phenomenology.

Primary author: TANG, Shihang (Sun Yat-sen University)

Co-author: HUANG, Fa Peng (Sun Yat-sen University)

Presenter: TANG, Shihang (Sun Yat-sen University)

Session Classification: Parallel talks (2A)

Contribution ID: **39** Type: **Oral Presentation**

Effective field theory of in-in correlators

Thursday, 10 September 2026 17:20 (20 minutes)

Equal-time in-in correlation functions are important observables for cosmological models and quantum field theories. In this talk, I will first explore how the Wilsonian renormalization group and effective field theory (EFT) apply to these observables in both flat and de Sitter space. Specifically, matching the UV and IR requires additional terms not captured by conventional EFT. These terms are collected in the influence functional from a Schwinger-Keldysh path integral point of view and are related to the evolution of the density matrix. Explicit examples show how matching is done in flat spacetime, and that in de Sitter spacetime these terms can become exponentially suppressed.

Primary author: SUN, Guanhao (Chongqing University)

Presenter: SUN, Guanhao (Chongqing University)

Session Classification: Parallel talks (1A)

Contribution ID: **40** Type: **Oral Presentation**

One-loop analysis of dark matter constraints in a complex scalar extension of the Standard Model

Sunday, 13 September 2026 13:10 (20 minutes)

We investigate the complex singlet extension of the Standard Model, which provides a scalar dark matter candidate. We impose the constraints from the observed relic abundance together with the most stringent limits from direct detection experiments on the model. The counterterms
are determined so that the vacuum and mass conditions are consistently satisfied at one-loop order, and the one-loop corrections to scalar self-interactions are fully included in the amplitudes involving
the dark matter particle. As a result, the allowed parameter region shows clear deviations from the tree-level analysis, demonstrating the impact of quantum corrections on the phenomenology of dark matter.

Primary author: IDEGAWA, Chikako (Sun Yat-sen University)

Presenter: IDEGAWA, Chikako (Sun Yat-sen University)

Session Classification: Parallel talks (3B)

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

Neutrino Magnetic Moments from Inverse Seesaw with Novel Horizontal Symmetry

Thursday, 10 September 2026 17:00 (20 minutes)

Mechanisms that generate large neutrino magnetic moments consistent with observed neutrino masses typically decouples the mechanism responsible for neutrino mass and the neutrino magnetic moment. In this letter, we propose a novel framework to explain neutrino mass while accommodating a large magnetic moment for the active neutrinos. The SM neutrinos get mass via the inverse seesaw mechanism. We introduce a novel horizontal-like softly broken $SU(2)_N$ symmetry in which SM particles are singlets. In the $SU(2)_N$ symmetric limit, one of the fermionic states participating in the inverse seesaw can possess a large magnetic moment while remaining massless. The $SU(2)_N$ symmetry is softly broken, and SM neutrinos obtain nonzero neutrino mass and large magnetic moment via sterile-active neutrino mixing. The active neutrinos can exhibit transition magnetic moments as large as $\mathcal{O}(10^{-11}\mu_B)$.

Primary author: KALADHARAN, Ajay (ICTP-AP)

Presenter: KALADHARAN, Ajay (ICTP-AP)

Session Classification: Parallel talks (1B)

Contribution ID: **42** Type: **Oral Presentation**

Primordial Black Holes as Gravitational-Wave Probes of Reheating: From PTAs to LISA and ET

Saturday, 12 September 2026 16:40 (20 minutes)

In this talk, I will discuss how primordial black holes (PBHs) and their associated stochastic gravitational-wave backgrounds can probe the post-inflationary Universe. I will first consider PBH formation during a non-standard reheating phase, where an enhanced primordial scalar power spectrum can simultaneously generate PBHs and scalar-induced gravitational waves. Accounting for uncertainties in PBH formation and current abundance constraints, I will show that a reheating phase with an equation of state stiffer than radiation can produce a gravitational-wave spectrum consistent with the NANOGrav 15-year data, with stronger Bayesian evidence than the supermassive black-hole binary scenario in suitable regions of parameter space. I will then discuss a complementary scenario in which PBHs dominate the Universe before evaporating through Hawking radiation, generating induced gravitational waves from both PBH isocurvature perturbations and enhanced adiabatic perturbations during the transition to radiation domination. Using signal-to-noise estimates and Fisher forecast analyses, I will present the prospects for detecting these signals with LISA and the Einstein Telescope. Together, these scenarios demonstrate how gravitational-wave observations from PTA to interferometer frequencies can constrain PBH formation mass, abundance, and the early-Universe equation of state, providing a multi-frequency probe of reheating.

References: JCAP 01 (2025) 118; JCAP 08 (2025) 074.

Primary author: HAQUE, Md Riajul (Tsung-Dao Lee Institute, Shanghai Jiao Tong University)

Presenter: HAQUE, Md Riajul (Tsung-Dao Lee Institute, Shanghai Jiao Tong University)

Session Classification: Parallel talks (2C)

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

Probing Ultralight Dark Matter with Laser Interferometers in Space

Friday, 11 September 2026 13:50 (30 minutes)

I will present my recent works on Probing Ultralight Dark Matter with Laser Interferometers in Space.

Primary author: TANG, Yong (University of Chinese Academy of Sciences)

Presenter: TANG, Yong (University of Chinese Academy of Sciences)

Session Classification: Plenary talks (2)

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

Dark Photon Dark Matter from Quantum Fluctuations during Starobinsky Inflation

Thursday, 10 September 2026 13:10 (30 minutes)

We present a detailed investigation of scenarios in which dark-photon dark matter is produced from quantum fluctuations during inflation. In particular, we focus on inflationary models that necessarily involve a Weyl transformation, dependent on the inflaton amplitude, in order to move to the Einstein frame. As a representative and phenomenologically important example, we analyze the Starobinsky inflation model, for which we perform an accurate computation of the relic dark-photon abundance. By imposing the relevant observational constraints, we find that, in order to reproduce the observed dark-matter density in the present Universe, the dark-photon mass is found to lie in the range 5.6 < m < 7.4 micro-eV.

Primary author: MOROI, Takeo (U. Tokyo)

Presenter: MOROI, Takeo (U. Tokyo)

Session Classification: Plenary talks (1)

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

Deconstructing the Extra-Dimensional Axion

Sunday, 13 September 2026 13:30 (20 minutes)

We present a four-dimensional deconstruction of the extra-dimensional axion arising from a $U(1)$ gauge theory in a five-dimensional orbifold, where the axion is identified with the Wilson line of the $U(1)$ gauge field and its coupling to QCD is generated by a 5D Chern-Simons (CS) term. We construct the corresponding 4D moose (quiver) gauge theory with link scalar fields, in which the axion emerges as a collective pseudo-Nambu-Goldstone boson. The axion-gluon coupling is described by a gauged Wess-Zumino-Witten term, providing the 4D counterpart of the 5D CS term. We further analyze non-perturbative effects from zero-mode and "fractional" instanton configurations. While the latter is exponentially suppressed in the regime corresponding to the 5D description, ensuring consistency with the higher-dimensional picture, we point out that this suppression can break down for smaller instantons whose inverse size exceeds the 5D cutoff scale, leading to a potentially significant effect. We also study axion potentials induced by bulk matter fields and boundary-localized symmetry-breaking operators, reproducing the characteristic nonlocal suppression associated with propagation in the extra dimension. Our construction provides a renormalizable 4D framework with a transparent understanding of the axion shift symmetry and its quality.

Primary author: XU, Junxuan (TDLI)

Presenter: XU, Junxuan (TDLI)

Session Classification: Parallel talks (3A)

Contribution ID: **47** Type: **Oral Presentation**

New Physics Searches at LIGO-Virgo-KAGRA

Sunday, 13 September 2026 09:00 (30 minutes)

I will go through the list of new physics search results at the LIGO-Virgo-KAGRA collaborations, which includes searches for early universe phase transitions, topological defects, searches for various species of dark matter, etc.

Primary author: GUO, Huaike (University of Chinese Academy of Sciences)

Presenter: GUO, Huaike (University of Chinese Academy of Sciences)

Session Classification: Plenary talks (4)

Contribution ID: **48** Type: **Oral Presentation**

Particle Production via Rippled Bubble Walls

Saturday, 12 September 2026 17:20 (20 minutes)

We investigate non-thermal particle production during first-order phase transitions in the presence of ultra-relativistic thick bubble walls with non-trivial internal structure. Extending the framework of bubble-expansion particle production, we consider bubble walls containing multiple ripples and study how such spatial modulations affect the production of heavy particles coupled to the order parameter field. By modeling an oscillatory thick-wall profile, we derive the transition probability for particle splitting processes in the wall background, and identify a new contribution associated with momentum transfer from the wall microstructure. In addition to the conventional channel, we find an enhanced production mode arising from resonant momentum exchange with the ripples. For sufficiently large numbers of ripples, the new contribution can dominate the production rate and significantly increase the abundance of particles much heavier than the phase transition scale. Our results demonstrate that the internal structure of expanding bubble walls can play an important role in particle production and should be taken into account when assessing the cosmological implications of strongly first-order phase transitions.

Primary authors: Prof. JINNO, Ryusuke (Kobe University); NAKAGAWA, Shota (Tsung-Dao Lee Institute, Shanghai Jiao Tong University); WANG, Yaoduo (TDLI); NAKAI, Yuichiro

Presenter: WANG, Yaoduo (TDLI)

Session Classification: Parallel talks (2A)

Contribution ID: **49** Type: **Oral Presentation**

Bogoliubov approach for fermion production in Milne spacetime

Saturday, 12 September 2026 16:40 (20 minutes)

First-order phase transitions in the early Universe are ubiquitous from the viewpoint of particle physics. Particle production during the nucleation and collision of bubbles has beed widely discussed. In this talk, we focus on fermion production induced by relativistic bubble collisions. The post-collision scalar-field dynamics in the planar approximation are described well in terms of Milne coordinates, rather than Minkowski, due to the SO(1,1) symmetry. We exploit this feature to develop a Bogoliubov formalism for fermions in Milne spacetime and study the spectrum and abundance of the produced fermion particles.

Primary authors: JINNO, Ryusuke (Kobe University); NAKAGAWA, Shota (Tsung-Dao Lee Institute, Shanghai Jiao Tong University); WANG, Yaoduo (TDLI); NAKAI, Yuichiro

Presenter: NAKAGAWA, Shota (Tsung-Dao Lee Institute, Shanghai Jiao Tong University)

Session Classification: Parallel talks (2A)

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

Ultra-High-Energy Cosmic Ray Boosted Relic Neutrinos

Saturday, 12 September 2026 13:40 (30 minutes)

Ultra-high-energy cosmic rays (UHECRs) can boost relic neutrinos to high energies through Standard Model (SM) neutral-current interactions, providing an indirect probe of the cosmic neutrino background (CνB). In this talk, I will discuss a systematic study of the diffuse UHECR-boosted CνB flux including elastic neutrino-nucleon scattering (ES), coherent elastic neutrino-nucleus scattering (COH), incoherent neutrino-nucleus scattering (INCOH), baryon-resonance production (RES), and deep inelastic scattering (DIS). We show a clear hierarchy of scattering channels in boosted neutrino energy: the coherent scattering dominates at low-energy neutrino flux for heavy nuclear component, while ES and INCOH become important once individual nucleons are resolved. The RES channel gives a non-negligible contribution in the high-energy region, and DIS appears only at the highest energies and is most visible for the H4a models.

Primary author: LIAO, Jiajun (Sun Yat-sen University)

Presenter: LIAO, Jiajun (Sun Yat-sen University)

Session Classification: Plenary talks (3)

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

Direct Search for Millicharged Particles Using Correlated Quantum Sensors

Saturday, 12 September 2026 15:30 (30 minutes)

Millicharged particles with tiny electric charge q_χ have garnered significant attention due to their profound implications for physics beyond the Standard Model. In this talk, I will present a direct laboratory search for such particles via Schwinger pair production using correlated quantum sensors. In the low-mass regime below 4.0×10^{-5} eV, our approach provides a model-independent constraint on the charge of millicharged fermions down to $\epsilon \equiv q_\chi/e \approx 1.7 \times 10^{-7}$, surpassing existing Schwinger-based laboratory limits by nearly one order of magnitude.

Primary author: DU, Peizhi (University of Science and Technology of China)

Presenter: DU, Peizhi (University of Science and Technology of China)

Session Classification: Plenary talks (3)

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

Large Hadronic Effects in B -> K* mu mu ?

Thursday, 10 September 2026 09:30 (30 minutes)

Rare decays of B mesons provide sensitive probes of physics beyond the Standard Model. Since many years, measurements of angular observables in the decay B -> K* mu mu by the LHCb experiment have attracted considerable attention, in particular due to the persistent discrepancy in the observable P5'. More recent results also hint at a non-zero value for the observable S7, raising important questions about the origin of these anomalies.
In this seminar, I will discuss the interpretation of the new LHCb measurements, focusing on the interplay between possible new physics contributions and hadronic effects. In particular, I will explain why a non-zero S7 points to sizable hadronic contributions with strong phases, and how such effects may simultaneously account for the observed deviation in P5'. Finally, I will discuss the role of CP asymmetries as probes of new physics and summarize the implications of combined fits of hadronic parameters and Wilson coefficients.

Primary author: ALTMANNSHOFER, Wolfgang (UC Santa Cruz)

Presenter: ALTMANNSHOFER, Wolfgang (UC Santa Cruz)

Session Classification: Plenary talks (1)

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

As simple as possible, but not simpler

Friday, 11 September 2026 09:00 (30 minutes)

When data anomalies are observed, it is a common practice to assume some toy models, simplified models, or EFT and interpret the anomalies. In particular, one tends to minimize the number of new physical degrees of freedom, as well as the number of couplings. In this talk, I will describe a few examples in physics of flavors and dark matter, where this simple-minded approach leads to incorrect or unphysical results. Based on these observations, I will advocate criteria that the simplest model for data analysis must satisfy to avoid this problem.

Primary author: KO, Pyungwon (Korea Institute for Advanced Study)

Presenter: KO, Pyungwon (Korea Institute for Advanced Study)

Session Classification: Plenary talks (2)

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

Revisiting Minimal Dark Matter Models

Friday, 11 September 2026 13:20 (30 minutes)

We revisit several minimal extensions of the Standard Model for dark matter. Depending on time, we discuss some or all of the following: (i) a scalar dark matter with higher-dimensional operators, where thermal misalignment provides a viable production mechanism; (ii) Majorana fermion dark matter with a coannihilating scalar, with the bino-slepton scenario in supersymmetry as a concrete benchmark; (iii) sterile neutrino dark matter in the presence of lepton flavor asymmetries. We present recent updates on each topic in light of current experimental constraints.

Primary author: HAMAGUCHI, Koichi (University of Tokyo)

Presenter: HAMAGUCHI, Koichi (University of Tokyo)

Session Classification: Plenary talks (2)

Contribution ID: **56** Type: **Oral Presentation**

MeV Electrophilic Axion-like Particles production from Sun and its detection

Sunday, 13 September 2026 14:10 (20 minutes)

This work explores the production of MeV-scale electrophilic axion-like particles (ALPs) by utilizing the monochromatic 5.5 MeV photon resulting from the nuclear fusion processes in the Sun. These 5.5 MeV photons can undergo Compton-like scattering with the ambient electrons in the solar matter to produce a substantial flux of MeV ALPs. Upon reaching the Earth, such ALPs can be detected via the same electron coupling, offering a new opportunity for the dark matter (DM) direct detection experiments to probe the previously unexplored parameter regions. We show that the existing data of LZ, PandaX-4T, and Borexino can attain the sensitivities gae ≲ 3.7 × 10−6 , gae ≲ 3.7 × 10−6 and gae ≲ 1.7 × 10−6 , respectively, for ma ≲ 1 MeV. An optimistic 200 tonne×year exposure by PandaX-xT can reach gae ≲ 1.6 × 10−6 for most of the mass window ma < 1,MeV and even gae ≲ 1.5 × 10−7 with ma approaching 1 MeV. Despite the stringent constraints from different laboratory experiments and astrophysical observations, our obtained limits from LZ, PandaX-4T, and Borexino can probe new parameter regions, specifically in the mass window 0.4 MeV ≲ ma ≲ 1 MeV.

Primary author: -, Sk Jeesun (Tsung Dao Lee Institute)

Presenter: -, Sk Jeesun (Tsung Dao Lee Institute)

Session Classification: Parallel talks (3A)

Contribution ID: **57** Type: **Oral Presentation**

Mechanisms of Kinetic Equilibrium between SIMP and radiation

Thursday, 10 September 2026 17:20 (20 minutes)

We propose a novel mechanism for achieving the required kinetic equilibrium between dark matter and a radiation bath during the freeze-out of self-annihilating dark matter. This mechanism arises naturally in a class of strongly coupled models containing nearly massless axions. Focusing on a strongly interacting massive particle (SIMP) scenario augmented by a dark axion, we demonstrate that the observed dark matter relic abundance can be reproduced without invoking a portal between the dark and visible sectors.

Primary authors: CHU, Xiaoyong (ICTP-AP, UCAS); KALADHARAN, Ajay (ICTP-AP); EL MOHTADI, Yassine (ICTP-AP, UCAS)

Presenter: EL MOHTADI, Yassine (ICTP-AP, UCAS)

Session Classification: Parallel talks (1C)

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

Parton spin correlations and CP properties in Higgs boson decay at future lepton colliders

Saturday, 12 September 2026 10:50 (30 minutes)

We present a phenomenological study of partonic spin correlations and CP properties in H->gg decay channel at future lepton colliders. We investigate two classes of observables: Lund observable defined based on subjets and four-point energy-energy correlator (E4C) between particles inside two jets. Our results show that the E4C with energy weighted to the power of n = 4 achieves the strongest sensitivity to the spin correlations of gluons from Higgs boson decay. Under the assumption of ideal identification of different gluon splitting modes, we estimate that future lepton colliders operating at \sqrt{s} = 240 GeV with an integrated luminosities of 5.6 ab−1 can successfully probe gluon
spin correlations, while 20 ab−1 of data can probe the CP-mixing angle in the Hgg coupling to less than 0.03π using E4C. We outline strategies for extending this framework to realistic detector-level analyses, which can provide a new pathway for the precision test of Standard Model and searches for new physics.

Primary author: LI, Yingying (Institute of High Energy Physics, CAS)

Presenter: LI, Yingying (Institute of High Energy Physics, CAS)

Session Classification: Plenary talks (3)

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

Opening remark

Thursday, 10 September 2026 08:50 (10 minutes)

Presenter: NAKAI, Yuichiro

Contribution ID: **61** Type: **Oral Presentation**

Electroweak baryogenesis from charged current anomalies in B meson decays

Thursday, 10 September 2026 17:40 (20 minutes)

We demonstrate for the first time that new physics explaining the long standing charged B meson anomalies, $R(D^{(*)})$, can be the source of CP violation that explains the observed baryon asymmetry of the universe (BAU). We consider the general two Higgs doublet model with complex Yukawa couplings and compute the BAU in the semiclassical formalism, using a novel analytic approximation for the latter. After imposing constraints from both flavor observables and the electron electric dipole moment (eEDM), we find that a significant BAU can still be generated for a variety of benchmark points in the parameter space, assuming the occurrence of a sufficiently strong first order electroweak phase transition. These scenarios, which explain both $R(D^{(*)})$ and the BAU, can be probed with future eEDM experiments and Higgs factories measurements.

Primary authors: Dr SIERRA FONSECA, CRISTIAN FELIPE (Tsung-Dao Lee Institute); Prof. RAMSEY-MUSOLF, Michael; ATHRON, Peter (Nanjing Normal University); WU, Yongcheng (Nanjing Normal University)

Presenter: Dr SIERRA FONSECA, CRISTIAN FELIPE (Tsung-Dao Lee Institute)

Session Classification: Parallel talks (1B)

Contribution ID: **62** Type: **Oral Presentation**

Thermal $\mathbb{Z}_3$ domain wall of Standard Model in the universe

Thursday, 10 September 2026 17:40 (20 minutes)

The Standard Model (SM) gauge theory with dynamical matter fields possesses an electric one-form $\mathbb{Z}_6$ symmetry, characterized by its action on Wilson line operators. At finite temperature, compactification on the thermal circle gives rise to a corresponding 0-form symmetry, whose spontaneous breaking can lead to the formation of domain walls. In this talk, I will focus on its $\mathbb{Z}_3$ subgroup in the $SU(3)_c \times U(1)_{\rm EM}$ theory with a PNJL-like model. Because this $\mathbb{Z}_3$ symmetry is exact, its presence persists even in the confined regime of QCD, dominated by QED. I will discuss the properties of the associated domain walls, their interactions with the thermal plasma, and their cosmological evolution. More broadly, phenomenological consequences of one-form symmetries provide a new probe of the global structure of the SM gauge group, with potential implications for distinguishing grand unified theories and constraining the existence of exotic charged particles.

Primary author: YANG, Yiming (University of Wisconsin-Madison)

Presenter: YANG, Yiming (University of Wisconsin-Madison)

Session Classification: Parallel talks (1A)

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

Dark energy-dark matter interaction

Saturday, 12 September 2026 13:10 (30 minutes)

Presenter: WANG, LianTao

Session Classification: Plenary talks (3)

Contribution ID: **65** Type: **Oral Presentation**

Macroscopic Dark Matter under siege: from White Dwarf Data to Gravitational Wave Detectors

Sunday, 13 September 2026 09:30 (30 minutes)

The nature of dark matter (DM) remains one of the most critical challenges in modern physics. Macroscopic DM present a compelling alternative to conventional particle DM, yet their terrestrial
search is notoriously challenging due to low number density. We presents a unified, multimessenger search strategy for macroscopic DM, dramatically improving existing constraints and proposing a new detection method. We first perform a model independent update of astrophysical constraints from compact objects, utilizing systematic calculations and additional white dwarf data related to ignition and subsequent supernovae. Crucially, for the first time, we explore novel signals of macroscopic DM in future gravitational wave detectors like LISA, TianQin, and Taiji, performing detailed signal-to-noise ratio and Fisher matrix analyses. We demonstrate that these detectors will
possess the requisite sensitivity to probe untouched regions of the DM parameter space. Our results underscore the unique power of the multi-messenger paradigm—spanning stellar astrophysics and gravitational wave astronomy—to explore this distinct and challenging frontier of DM physics.

Primary author: HUANG, Fa Peng (Sun Yat-sen University)

Presenter: HUANG, Fa Peng (Sun Yat-sen University)

Session Classification: Plenary talks (4)

Contribution ID: **66** Type: **Oral Presentation**

Comprehensive Effective Field Theory Framework for Coherent Elastic Neutrino-Nucleus Scattering

Friday, 11 September 2026 15:50 (30 minutes)

Coherent elastic neutrino–nucleus scattering (CEνNS) provides a powerful probe of Standard Model neutral-current interactions, neutrino properties, nuclear structure, and new physics. In this talk, I will present a comprehensive EFT framework for CEνNS that systematically connects high-energy ultraviolet scenarios to low-energy nuclear recoil observables. By incorporating LEFT operators up to dimension 8, QCD renormalization-group running, and chiral matching via the spurion method, we establish a top-down pipeline from tree-level UV completions through SMEFT and LEFT to nuclear response functions and experimental data. Using current CEνNS measurements, this framework enables global constraints on generic EFT coefficients, neutrino non-standard interaction parameters, and underlying UV model parameters, thereby bridging model building, precision neutrino measurements, and low-energy nuclear physics.

Primary author: LI, Gang (Sun Yat-Sen University)

Presenter: LI, Gang (Sun Yat-Sen University)

Session Classification: Plenary talks (2)

Contribution ID: **67** Type: **Oral Presentation**

Glueball Dark Matter： From Thermal Resummation to Gravitational Waves and Direct Detection

Sunday, 13 September 2026 10:20 (30 minutes)

This talk gives a unified perspective on the phase transitions, gravitational waves, and dark matter detection prospects of strongly coupled dark sectors. I first review lattice-informed effective descriptions of dark confinement and chiral dynamics, and show how the resulting first-order transitions generate observable gravitational wave signals, strongest in the near-conformal, strongly supercooled regime. I then point out that the self-consistent 2PI/CJT dressing forced upon us by strong coupling in the dark sector and partial dressing in the perturbative regime are the same prescription —a dressed propagator with a tree-level vertex —whereas the Parwani and Arnold–Espinosa schemes standard in the gravitational wave literature are truncated full dressing. We give a multi-field, scan-ready implementation and quantify the difference in conformal and non-conformal two-Higgs-doublet models: in the conformal case it systematically yields stronger, more supercooled transitions and the largest peak amplitudes, while in the non-conformal case the dependence is more intricate and can even reassign the thermal history of the same zero-temperature point. Once the tree-level curvature vanishes, the barrier is generated entirely by the resummed self-energy, so the prescription no longer corrects the answer but determines it —exactly the regime where dark-sector transitions live. Building on this, I discuss the non-perturbative thermal evolution of the dark gluon–glueball system and the controlled prediction of the glueball dark matter relic abundance, composite glueball axion-like particles from the θ term and heavy fermion portals, and recent progress matching ultraviolet portal operators onto non-perturbative glueball amplitudes through a tensor-Pomeron-inspired effective field theory, opening a quantitative path to direct detection.

Primary author: WANG, Zhi-Wei (UESTC)

Presenter: WANG, Zhi-Wei (UESTC)

Session Classification: Plenary talks (4)

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

Late-time Quantum Vacuum Decay and its Cosmological Implications

Saturday, 12 September 2026 16:40 (20 minutes)

The existence of a landscape of metastable vacua raises the possibility that our Universe may have undergone quantum vacuum decay at late times. This work explores how such a transition can be tested with cosmological observables, focusing on precision distance measurements and cosmic microwave background (CMB) anisotropies. A set of phenomenological models is constructed in which late-time quantum tunneling changes the vacuum energy and may convert a subcomponent of dark matter into dark radiation, possibly accompanied by domain-wall production. The resulting expansion histories are compared with DESI DR2 baryon acoustic oscillation data; supernova distance measurements from DES-Dovekie, Pantheon+, and Union3; and a compressed CMB likelihood. For quantum-tunneling models, current cosmological distance measurements still allow a 50% decrease in the total vacuum energy for a transition redshift $z_t < 1$. The model with dark-matter conversion and domain-wall production provides a good fit to resolve the tension between cosmological observables and the ΛCDM model, with a preferred transition around $z_t \sim 7$ and about 10% of dark matter participating in the transition. Additionally, CMB anisotropy constraints from bubble nucleation and the associated domain-wall network are derived and shown to strongly restrict slow or sparse late transitions. Applied to the minimal quantum-tunneling model, these constraints allow an \mathcal{O}(10%) decrease in the total vacuum energy for a transition redshift z_t of order unity. For nonminimal models, dark-matter-density-dependent tunneling can proceed rapidly enough to evade such bounds. These results demonstrate that late-time quantum vacuum decay is a testable cosmological phenomenon and provide a concrete observational handle on metastable-vacuum physics motivated by landscape scenarios.

Primary author: LU, Sida (Sun Yat-sen University)

Presenter: LU, Sida (Sun Yat-sen University)

Session Classification: Parallel talks (2B)

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

TBA

Friday, 11 September 2026 11:30 (30 minutes)

Presenter: ATHRON, Peter (Nanjing Normal University)

Session Classification: Plenary talks (2)

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

TBA

Sunday, 13 September 2026 15:20 (30 minutes)

Presenter: GU, Jiayin (Fudan University)

Session Classification: Plenary talks (4)

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

Cosmological Signatures of Neutrino Seesaw Mechanism

Friday, 11 September 2026 16:20 (30 minutes)

Presenter: HAN, Chengcheng (Sun Yat-sen university)

Session Classification: Plenary talks (2)

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

TBA

Saturday, 12 September 2026 10:20 (30 minutes)

Presenter: KITANO, Ryuichiro (Yukawa Institute for Theoretical Physics, Kyoto University)

Session Classification: Plenary talks (3)

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

TBA

Thursday, 10 September 2026 11:20 (30 minutes)

Presenter: LI, Lingfeng (Brown U.)

Session Classification: Plenary talks (1)

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

TBA

Friday, 11 September 2026 14:20 (30 minutes)

Presenter: LIU, Jia (Peking University)

Session Classification: Plenary talks (2)

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

TBA

Thursday, 10 September 2026 10:20 (30 minutes)

Presenter: LIU, Tao (HKUST)

Session Classification: Plenary talks (1)

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

TBA

Friday, 11 September 2026 09:30 (30 minutes)

Presenter: LIU, Zhen (University of Minnesota)

Session Classification: Plenary talks (2)

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

TBA

Thursday, 10 September 2026 10:50 (30 minutes)

Presenter: LONG, Andrew (Rice University)

Session Classification: Plenary talks (1)

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

Novel Heavy Neutral Lepton Searches With Next-Generation Muon Accelerators

Sunday, 13 September 2026 15:50 (30 minutes)

Heavy neutral leptons (HINLs) provide a minimal and testable origin of neutrino masses and can-generate the baryon asymmetry through low-scale leptogenesis. Their small active sterile mix-inghowever, makes much of the theoretically motivated parameter space inaccessible to existing experimentsWe show that a future high-energy muon facility can operate as a heavy-neutrino factory and muon colliderWe study four complementary search modes: HNL production in muon decays, a high-energy muonbeam dump, an atmospheric beam dump using the Earth as a target, and deep-inelastic productionat a muon-ion collider. These searches probe HINL masses from be-low the muon mass to approximately 100 GeVand improve sensitivity to muon-flavor mixing by several orders of magnitude. A substantial partof the parameter space compatible with the type-I seesaw and Akhmedov-Rubakov-Smirov leptogenesis becomes experimentaly accessible.

Presenter: LU, Peng-Cheng

Session Classification: Plenary talks (4)

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

TBA

Saturday, 12 September 2026 09:30 (30 minutes)

Presenter: RAMSEY-MUSOLF, Michael (Tsung-Dao Lee Institute, Shanghai Jiao Tong University)

Session Classification: Plenary talks (3)

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

TBA

Thursday, 10 September 2026 14:10 (30 minutes)

Presenter: SUN, Chen (ICTP, Trieste)

Session Classification: Plenary talks (1)

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

TBA

Saturday, 12 September 2026 14:10 (30 minutes)

Presenter: YIN, Zhewei (Institute of High Energy Physics, Chinese Academy of Sciences)

Session Classification: Plenary talks (3)

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

Symmetry dictates Operators: from Electroweak to Atomic EFTS

Saturday, 12 September 2026 11:20 (30 minutes)

Presenter: YU, Jiang-Hao

Session Classification: Plenary talks (3)

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

TBA

Thursday, 10 September 2026 09:00 (30 minutes)

Presenter: YUAN, C.-P. (Michigan State University)

Session Classification: Plenary talks (1)

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

TBA

Thursday, 10 September 2026 15:30 (30 minutes)

Presenter: ZHANG, Hao (Theoretical Physics Division, Institute of High Energy Physics, Chinese Academy of Sciences)

Session Classification: Plenary talks (1)

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

TBA

Saturday, 12 September 2026 09:00 (30 minutes)

Presenter: ZHOU, Shun (IHEP)

Session Classification: Plenary talks (3)