Sichuan University and IBS CTPU-CGA joint workshop on frontier of theoretical particle physics and gravity

Report of Contributions

https://indico-tdli.sjtu.edu.cn/e/4832

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

Impostor Among νs: Dark Radiation Masquerading as Self-Interacting Neutrinos

Multiple cosmological observations hint at neutrino self-interactions beyond the Standard Model, yet such interactions face severe constraints from terrestrial experiments. We resolve this tension by introducing a model where active neutrinos resonantly convert to self-interacting dark radiation after BBN but before CMB epoch. This exploits the fact that cosmological observables cannot distinguish between neutrinos and dark radiation with the same abundance and free-streaming properties. Our mechanism, based on a simple Type-I seesaw framework along with a keV-scale scalar mediator, achieves two objectives: (1) it produces strongly self-interacting dark radiation that imitates neutrino self-interactions favored by cosmological data, and (2) it depletes the active neutrino energy density, relaxing cosmological neutrino mass bounds and easing the tension with neutrino oscillation data. The model naturally evades laboratory constraints through suppression of the neutrino-mediator coupling by the squared mass ratio of active and sterile neutrinos. We demonstrate how this scenario is favored over ΛCDM by the combined Planck and DESI data, while being consistent with all other constraints. Our mechanism is testable in future laboratory probes of absolute neutrino mass and searches for sterile neutrinos.

Primary authors: Prof. DAS, Anirban (Saha Inst. and HBNI, Mumbai); Prof. DEV, Bhupal (Washington U., St. Louis); GAO, Christina; Dr GHOSH, Subhajit (U. Texas, Austin); KIM, Taegyun (Southern University of Science and Technology (SUSTech))

Presenter: KIM, Taegyun (Southern University of Science and Technology (SUSTech))

Contribution ID: **2** Type: **not specified**

Cosmic Neutrino Background Detection with Tritium

The Cosmic Neutrino Background (CNB) is a robust thermal relic of the Big Bang and a potential probe of neutrino mass properties and of the Universe at O(1) second. A leading direct-detection strategy is neutrino capture on tritium, where observing a distinct capture peak requires excellent effective energy resolution. In practice, binding and solid-state effects can broaden the endpoint spectrum, potentially pushing experiments into a background-dominated regime with significant modeling uncertainties. In this ongoing work, we perform a unified sensitivity study for (i) an energy-only endpoint analysis and (ii) a joint energy–angle analysis that exploits the CNB dipole anisotropy. Using profile-likelihood methods with nuisance parameters, we quantify the exposure and systematic-control requirements for discovery. The energy-only approach can hit a systematic "floor," where increasing exposure no longer improves significance, while an angular analysis can cancel leading normalization systematics and provide a complementary handle on backgrounds.

Primary author: UWABO-NIIBO, Michiru (Institute for Basic Science)

Presenter: UWABO-NIIBO, Michiru (Institute for Basic Science)

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

Topics in Dark Matter Physics

I will talk about a few topics in dark matter physics based on dark U(1) guauge symmetry and dark Higgs boson: (i) two-component WIMP sceario is well alive, (ii) 511 keV line in multi-component DM model, (iii) Belle-II $B^+ \to K^+\nu\bar{\nu}$ excess from a light dark sector scenario, (iv) KM3 high energy neutrino events and gravitational wave signatures.

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

Co-authors: KIM, Jinsu; KIM, Jongkuk (Chung-Ang University); KHAN, Sarif; HO, Shu-Yu

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

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

Curvature-assisted dynamical compactification

Extra dimensions unavoidably appear in superstring theory, which is a plausible candidate for quantum gravity theory. Such extra dimensions should be small enough today to avoid observational inconsistency, which is achieved if the gravitational degrees of freedom (moduli) acquire effective potential to obtain vacuum expectation values that realize sufficiently small extra dimension volume.
Extrapolating from our observational facts that our universe has been expanding, one may think that the extra dimensions can also be smaller in the early universe and expand. However, such a scenario generally leads to the decompactification problem where the extra dimensional volume continue to expand.
We propose a scenario where our observed 3D space is initially open universe and extra dimension expands as our 3D spaces, while only extra dimensions stop to expand at some time. The key to realize such dynamics for moduli is the open universe curvature which gives strong Hubble friction force. Then, after moduli stabilization, subsequent inflation only expands 3D space and dilutes the open universe curvature, which makes the scenario observationally consistent.
We will also discuss possible consequences of our new scenario.

Primary author: YAMADA, Yusuke (IBS CTPU-CGA)

Presenter: YAMADA, Yusuke (IBS CTPU-CGA)

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

Multimessenger probes of a complex singlet extension of the Standard Model

We study multimessenger probes of a complex singlet extension of the Standard Model through a strongly first-order electroweak phase transition. The same phase transition can induce primordial black hole formation, generate stochastic gravitational waves, and modify the Higgs triple coupling.

We explore how these observables are correlated and show that they provide complementary ways to test the model at gravitational wave detectors, microlensing surveys, and future lepton colliders. In addition, the model contains a viable dark matter candidate, allowing for further constraints on the parameter space from current dark matter experiments.

This demonstrates the potential of a multimessenger strategy to probe new physics at the electroweak scale.

Primary authors: YANG, Aidi; IDEGAWA, Chikako (Sun Yat-sen University); HUANG, Fa Peng (Sun Yat-sen University)

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

Contribution ID: **6** Type: **not specified**

Freeze-in sterile neutrino DM in a feebly gauged $B-L$ model

We consider the gauged $\mathrm{U(1)_{B-L}}$ model and examine the situation where the sterile neutrino is a dark matter candidate produced by the freeze-in mechanism. In our model, the dark matter N is mainly produced by the decay of a $\mathrm{U(1)_{B-L}}$ breaking scalar boson ϕ. We point out that the on-shell production of ϕ through annihilation of the $\mathrm{U(1)_{B-L}}$ gauge boson Z' plays an important role. We find that the single production of Z' from the gluon bath in the early Universe can become the main production mode for Z' in some parameter regions. To prevent N from being overproduced, we show that the $\mathrm{U(1)_{B-L}}$ gauge coupling constant g_{B-L} must be as small as 10^{-16}—10^{-10}. We also consider the case where the decay of ϕ into N is kinematically forbidden. In this case, N is generated by the scattering of Z' and the g_{B-L} takes values of 10^{-10}—10^{-6}, which can be explored in FASER, FASER2 and SHiP. We will show the sensitivity of FASER, FASER2, and SHiP. This talk is based on JHEP 05 (2025) 147 and arXiv:2603.28882.

Primary authors: Dr ASAI, Kento (Kyoto University); Prof. SETO, Osamu (Hokkaido University); Prof. SHIMOMURA, Takashi (Miyazaki University); Prof. ARAKI, Takeshi (Ohu University); Mr NAKASHIMA, Yohei (Kyushu University); Dr UCHIDA, Yoshiki (Central China Normal University)

Presenter: Dr UCHIDA, Yoshiki (Central China Normal University)

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

Composite Asymmetric Dark Matter from Primordial Black Holes

We investigate a cogenesis scenario for composite asymmetric dark matter framework: a dark sector has a similar strong dynamics to quantum chromodynamics in the standard model, and the dark-sector counterpart of baryons is the dark matter candidate. The Hawking evaporation of primordial black holes plays the role of a source of heavy scalar particles whose CP-violating decay into quarks and dark quarks provides particle-antiparticle asymmetries in baryons and dark matter, respectively. Primordial black holes should evaporate after the electroweak phase transition and before the big-bang nucleosynthesis for explaining the baryon asymmetry of the Universe and for consistent cosmology. We find that this scenario explains the observed values for both baryon and dark matter energy densities when the heavy scalar particles have a mass of 10^6 - 10^9 GeV and the primordial black holes have masses of 10^7 - 10^9 g.

Primary author: KUWAHARA, Takumi (Jilin U)

Co-author: UCHIDA, Yoshiki (South China Normal University)

Presenter: KUWAHARA, Takumi (Jilin U)

Contribution ID: **8** Type: **not specified**

Boosted dark matter from galactic and cosmological semi-annihilation

In scenarios where the dark matter (DM) relic abundance is set by semi-annihilation, two DM particles can produce one dark matter particle and one Standard Model particle. These processes may still occur today in both the Milky Way galaxy and the early Universe, generating a flux of boosted DM particles. We study the resulting signals in direct detection and neutrino experiments for sub-GeV DM masses. For galactic semi-annihilation, we show that for typical cross-section values, the sensitivity of current experiments to the spin-independent DM–proton scattering cross-section can exceed existing limits from cosmic-ray boosted DM by several orders of magnitude. We also compute the cosmological contribution from semi-annihilation in an inhomogeneous high-redshift DM distribution, using a state-of-the-art boost-factor model. We show that this component can enhance the reach of current searches by up to two orders of magnitude and may allow future experiments to probe scattering cross-sections in the femtobarn range for sub-GeV DM.

Primary authors: BETANCOURT KAMENETSKAIA, Boris (Institute for Basic Science CTPU-CGA); Prof. GARNY, Mathias (TUM); Prof. IBARRA, Alejandro (TUM); Ms MUSUMECI, Alessia (TUM); Dr REICHARD, Merlin (KIAS)

Presenter: BETANCOURT KAMENETSKAIA, Boris (Institute for Basic Science CTPU-CGA)

Contribution ID: **9** Type: **not specified**

Supermassive Primordial Black Holes from a Catalyzed Dark Phase Transition for Little Red Dots

JWST has revealed an abundant population of compact, low-metallicity Little Red Dots (LRDs) at high redshift, challenging conventional scenarios in which supermassive black holes (SMBHs) grow from stellar-mass seeds. We consider a scenario in which the SMBHs are instead supermassive primordial black holes (SMPBHs), formed directly in a decoupled, subdominant dark sector undergoing a first-order phase transition. Unlike conventional stochastic phase transitions, our mechanism is based on the catalysis by domain walls (DWs): most of the Universe completes the transition rapidly, while rare long-lived false-vacuum domains survive because of DW statistics and collapse into PBHs. This mechanism naturally yields SMPBH seeds with masses up to $M_{\rm PBH} \sim O(10^{10}) M_\odot$, whose abundance can account for the observed LRD population. It also avoids the usual tensions with phase transition completion, $\Delta N_{\rm eff}$, and large curvature perturbations. The dark phase transition simultaneously generates an ultra-low-frequency stochastic gravitational-wave background peaking near the pulsar-timing-array range, providing a test of this dark-sector origin of LRDs. This presentation is based on arXiv: 2604.01304.

Primary author: TANAKA, Masanori (Peking University)

Presenter: TANAKA, Masanori (Peking University)

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

Cosmological signatures of neutrino seesaw mechanism

Cosmological signatures of neutrino seesaw mechanism

Primary author: Prof. HAN, Chengcheng (Sun Yat-sen university)

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

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

Metastable domain wall in the continuous U(1) group

In the literature, the domain wall is usually connected with some discrete symmetry. For the continuous case, a discrete symmetry arises as an intermediate stage, but what if the scale of the U(1) symmetry is similar or lower with the “discrete symmetry”? We show how the domain wall disappear and the discrete symmetry becomes invalid.

Primary author: TANG, Yi-Lei (中山大学)

Presenter: TANG, Yi-Lei (中山大学)

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

Covariant scalar-tensor theories beyond second derivatives

We propose a covariant, gauge-independent construction of foliation-based scalar-tensor theories, yielding diffeomorphism-invariant operators involving only gradients on the hypersurfaces where the scalar field is constant, assumed to be spacelike. This defines a basis of independent invariants up to four derivatives of, including the first nontrivial parity-odd pseudoscalar at this order, with a straightforward extension to higher derivatives. Our framework goes beyond degenerate higher-order scalar-tensor (DHOST) theories and provides a nonlinear extension of U-DHOST directly in covariant form, without using unitary gauge as a starting point or imposing degeneracy a priori. After minimal coupling to gravity, we analyze the theory through its Hamiltonian constraint structure and linear cosmological perturbations about an FLRW background, and show that it propagates three physical degrees of freedom.

Primary authors: Mr NOUI, Karim (IJCLab, Orsay); Mr ALI GORJI, Mohammad (IBS CTPU CGA); PETROV, Pavel (IBS CTPU CGA)

Presenter: PETROV, Pavel (IBS CTPU CGA)

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

Search for ultralight scalar dark matter with quadratic interactions

In this talk, I will discuss about my recent work on the searches for the ultralight scalar dark matter with quadratic interactions with SM fields. This will lead to the effective interactions between the ultralight dark matter and the nucleon fields phiˆ2 N N/f below the QCD confinement scale, which can be thought as potential barrier for the dark matter wind in the presence of ordinary matter. When the potential barrier is large enough compared with the kinetic energy of the dark matter, the dark matter flux will bounce back from the ordinary object, as a result inducing a pressure force on the object. After taking into the constraints from Supernova cooling, BBN and gravitational inverse square law test, there exists parameter spaces in our model which can be searched for by utilizing this force effect on the experiment for the test of the weak equivalence principle.

Primary author: Prof. LIU, Da (Shandong University)

Presenter: Prof. LIU, Da (Shandong University)

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

Verifiable Origin of Neutrino Masses and Ultra High Energy Astrophysical Neutrinos

In this talk, we discuss the possible common origin of small neutrino masses and the source of ultra high energy astrophysical neutrinos detected in neutrino telescope experiments, such as ICECUBE and KM3NeT. This is done in the framework of the dark matter model. The correlation between neutrino mass parameters, dark matter mass, and neutrino's ultra high energy and flux are studied. The relevant constraints are discussed.

Primary authors: POPOV, Oleg (Shenzhen MSU-BIT University); NOMURA, Takaaki (Sichuan University)

Presenter: POPOV, Oleg (Shenzhen MSU-BIT University)

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

Axion inflation with gauged lepton flavor symmetry, large lepton asymmetry, and helium abundance

Axion inflation can have a Chern-Simons coupling to gauge fields. Depending on the gauge fields, it gives rise to the magnetic field production together with fermion asymmetry. For example, in the case of U(1) hypergauge field in the Standard Model, we generate B+L asymmetry. In this talk, I will examine the case of U(1) gauged lepton flavor symmetry, which can produce lepton asymmetry. Their implications on the Big Bang Nucleosynthesis will be discussed.

Primary author: KAMADA, Kohei (HIAS UCAS)

Presenter: KAMADA, Kohei (HIAS UCAS)

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

Hints and constraints on ultralight dark matter by astronomical observations

Generated by misalignment mechanism of axion-like particle dark matter may favor an ultralight mass, which can be described by classical wave field. The ultralight wave dark matter can produce fluctuating gravitational potential due to the interference between waves, which can stochastically heat the stellar systems embedded in the dark matter halo. We will talk about the observational hints of such heating effects and the constraints on the ultralight dark matter by astronomical observations.

Primary author: 毕, 效军 (中科院高能所)

Presenter: 毕, 效军 (中科院高能所)

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

Probing High-Energy Physics with Topological Defects

Topological defects provide a powerful framework for exploring nonperturbative phenomena across high-energy physics and cosmology. In this talk, I will present a general overview of recent developments on the role of cosmic strings as probes of physics beyond the Standard Model. Particular emphasis will be placed on gravitational-wave signatures generated by cosmic string networks and their potential as observational windows into otherwise inaccessible high-energy physics. I will discuss how current and future cosmological observations can constrain the underlying particle-physics scenarios responsible for the formation and evolution of these defects.

Primary author: RYBAK, Ivan (IBS CTPU-CGA)

Presenter: RYBAK, Ivan (IBS CTPU-CGA)

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

Ultimate Quantum Precision Limit at Colliders

We investigate whether collider experiments can reach the quantum limit of precision, defined by the quantum Fisher information (QFI), using only classical observables such as particle momenta. As a case study, we focus on the $\tau^+\tau^-$ system and the decay channel $\tau \to \pi\nu$, which offers maximal spin-analyzing power and renders the decay a projective measurement. We develop a general framework to determine when collider measurements can, in principle, saturate the QFI in an entangled biparticle system, and this framework extends naturally to other such systems. Within this framework, QFI saturation occurs if and only if the symmetric logarithmic derivative (SLD) commutes with a complete set of orthonormal separable projectors associated with collider-accessible measurements. This separability condition, reflecting the independence of decay amplitudes, is highly nontrivial. To meet this condition, a key requirement is that the spin density matrix be rank-deficient, allowing the SLD sufficient freedom. We show that the classical Fisher information asymptotically saturates the QFI for magnetic dipole moments and CP-violating Higgs interactions in selected phase-space regions, but not for electric dipole moments. These results bridge quantum metrology and collider physics, providing a systematic method to identify quantum-optimal sensitivity in collider experiments.

Primary author: LIU, Jia (Peking University)

Presenter: LIU, Jia (Peking University)

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

Observing Lorentz-violating effects on the gamma-ray horizon

The arrival of TeV-energy photons from distant galaxies is expected to be affected by their QED interaction with intergalactic radiation fields through electron-positron pair production. In theories where high-energy photons violate Lorentz symmetry, the kinematics of the process γ + γ → e + + e− is altered and the cross-section suppressed. Consequently, one would expect more of the highest-energy photons to arrive if QED is modified by Lorentz violation than if it is not. In this talk, I will show the detection perspectives of such signals, using the simulated sensitivities of future detectors. I will then contrast the forecasted sensitivity with those obtained from spectral lags in γ-ray burst data.

Primary author: NILSSON, Nils Albin (CTPU-CGA, Institute for Basic Science, Korea)

Presenter: NILSSON, Nils Albin (CTPU-CGA, Institute for Basic Science, Korea)

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

A New Origin of the Big Bang Universe and Its Gravitational Wave Signature

I will talk about a new origin of the big bang universe in which the inflaton field inject all its energy into a kination dominated dark sector, and at that time the standard model sector was in a meta stable vacuum state. Then, the Hubble expansion rate drops due to the dillution of the energy in the dark sector, and when the Hubble expansion rate is small enough the phase transition in the standard model sector will complete. The thermalization of the high energy bubble shells heats the standard model sector up, and it goes into the phase of the standard big bang. I will show that the strength of gavitational wave produced in this scenario can almost saturate the N_eff bound, and with a double log structure in the IR part.

Primary author: AN, Haipeng (Tsinghua University)

Presenter: AN, Haipeng (Tsinghua University)

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

Abelian-Higgs vortices in the oscillating axion background

Axion is one of the well-motivated candidates for dark matter and there have been many attempts for axion dark matter search. In this talk, we show novel aspects of the axion dark matter, which significantly modify the physics of vortex in the Abelian-Higgs model. Due to the axion-photon conversion, electromagnetic fields are induced in the magnetic core of the vortex. In numerical simulations, we find that the induced electromagnetic field is confined and resonantly enhanced in the vortex, which implies that the vortex acts as a cylindrical cavity. We also focus on the interaction of two vortices in the oscillating axion background, resulting in attractive or repulsive forces, even in the case with the BPS limit. These new features open up a new possibility for the axion dark matter search using superconducting devices.

Primary authors: KITAJIMA, Naoya (Tohoku University); NAKAGAWA, Shota (Tsung-Dao Lee Institute, Shanghai Jiao Tong University)

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

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

Boosted Dark Matter Heating of Compact Stars Beyond Capture

Compact astrophysical objects, such as neutron stars and white dwarfs, can act as detectors of energetic particle fluxes originating from astrophysical accelerators. While most existing capture and heating calculations assume isotropic very low energetic incident fluxes from the halo dark matter, many realistic sources produce highly directional beams or jets, for which gravitational focusing, trajectory multiplicity, and local energy deposition must be treated consistently. In this work, we develop a general relativistic formalism to compute the local density, capture probability, and energy deposition of particles arriving as directed beams onto compact objects. The framework is based on the mapping of an asymptotic particle flux to local densities through geodesic congruences, allowing for gravitational focusing, multi–stream regions, and optical depth effects to be incorporated in a unified way. The formalism applies to arbitrary particle species and interaction models, and separates capture from through–going energy deposition in a frame–consistent manner. As an explicit application, we consider relativistic particle beams generated in astrophysical jets and evaluate their interaction with two compact objects samples: a white dwarf and a neutron star. In particular, we illustrate the framework using boosted dark matter produced in a list of 324 blazars as a representative case study, computing the resulting fluxes and the associated heating in the selected stars. Additional regimes such as the interaction roof and geometric limit are discussed, highlighting the conditions under which compact objects can efficiently convert incident beam energy into observable heating.

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

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

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

Physical remnant of Electro-weak theta angle

In addtion to well-known strong CP violation theta angle, we find another invariant electro-weak theta angle after electro-weak symmetry breaking(EWSB), which can be another physical parameter of the Standard Model. It could be physical if the spacetime is a non-simply connected manifold beyond our visible universe or a laboratory setup of the non-simply connected background field. The new theta angle may be detected in future experiments, and provide constraints on new physics beyond the standard model.

Primary author: 孙 SUN, 铮 Zheng (四川大学)

Presenter: 邹, 瑛培 (四川大学)

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

The Impact of String Thickness on GW Spectrum of Cosmic String Network

The stochastic gravitational wave background predicted by cosmic strings has attracted great attention due to its capability of explaining pulsar timing array observations. However, the vast majority of string network models concentrate on the currently observable frequency range, i.e., 10^{-9} Hz to 100 Hz. Few studies focus on the ultra-high-frequency band because of current observational limitations, even though this regime is closely related to elementary properties of string loops and must be theoretically constrained. In our recent work, we propose a series of assumptions and discuss the relationship among the breakdown of the Nambu-Goto approximation, the termination of GW emission and the resulting ultra-high-frequency GWs. Based on our primary assumptions, we analytically compute the GW spectrum using a modified BOS loop number density. In our analytical calculation, we discover characteristic frequencies of spectrum plateau breaking and harmonic-modes-independent cutoff in ultra-high-frequency range. Ultimately, we discuss the cuspy (kinky) limit of our assumptions and identify the limitations of current numerical simulation of string networks.

Primary author: HU, Yifan

Co-author: KOHEI, Kamada

Presenter: HU, Yifan

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

Opening Remarks: From Host institute

Monday, 25 May 2026 09:00 (5 minutes)

Presenter: Prof. QI, Jiangqi (Sichuan University)

Session Classification: Opening Remarks

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

Opening Remarks: From co-organizing Institute

Monday, 25 May 2026 09:05 (5 minutes)

Presenter: Prof. YAMAGUCHI, Masahide (IBS-CTPU-CGA)

Session Classification: Opening Remarks

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

GUT Seesaw Parameters from Low Energy Flavor Physics Inputs

Monday, 25 May 2026 09:10 (40 minutes)

Presenter: Prof. HE, Xiao-Gang

Session Classification: Morning session 1

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

Cosmological signatures of neutrino seesaw mechanism

Monday, 25 May 2026 09:50 (30 minutes)

Presenter: Prof. HAN, Chengcheng

Session Classification: Morning session 1

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

A New Origin of the Big Bang Universe and Its Gravitational Wave Signature

Monday, 25 May 2026 10:50 (30 minutes)

Presenter: Prof. AN, Haipeng

Session Classification: Morning session 2

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

On homogeneous and isotropic turbulence in the early universe

Monday, 25 May 2026 11:20 (30 minutes)

Presenter: Dr UCHIDA, Fumio

Session Classification: Morning session 2

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

Hints and constraints on ultralight dark matter by astronomical observations

Monday, 25 May 2026 11:50 (30 minutes)

Presenter: Prof. BI, Xiao-Jun

Session Classification: Morning session 2

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

Paths to Solving the Strong CP Problem and the Footprints Left Behind

Monday, 25 May 2026 14:00 (30 minutes)

Presenter: Prof. NAKAI, Yuichiro

Session Classification: Afternoon Session 1

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

Effective Field Theory and In-In Correlators

Monday, 25 May 2026 14:30 (30 minutes)

Presenter: SUN, Guanhao

Session Classification: Afternoon Session 1

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

Probing High-Energy Physics with Topological Defects

Monday, 25 May 2026 15:00 (30 minutes)

Presenter: RYBAK, Ivan (IBS CTPU-CGA)

Session Classification: Afternoon Session 1

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

Abelian-Higgs vortices in the oscillating axion background

Monday, 25 May 2026 16:00 (20 minutes)

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

Session Classification: Afternoon Session 2

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

Boosted Dark Matter Heating of Compact Stars Beyond Capture

Monday, 25 May 2026 16:20 (20 minutes)

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

Session Classification: Afternoon Session 2

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

Composite Asymmetric Dark Matter from Primordial Black Holes

Monday, 25 May 2026 16:40 (20 minutes)

Presenter: KUWAHARA, Takumi (Jilin U)

Session Classification: Afternoon Session 2

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

Search for ultralight scalar dark matter with quadratic interactions

Monday, 25 May 2026 17:00 (20 minutes)

Presenter: LIU, Da (Shandong University)

Session Classification: Afternoon Session 2

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

Topics in Dark Matter Physics

Tuesday, 26 May 2026 09:00 (40 minutes)

Presenter: Prof. KO, Pyungwon

Session Classification: Morning session 1

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

Truth and Beauty: Quantum Entanglement Theory and Its Searches at the Colliders

Tuesday, 26 May 2026 09:40 (40 minutes)

Presenter: Prof. LI, Tianjun

Session Classification: Morning session 1

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

An Analytic Prescription for t-channel Singularities

Tuesday, 26 May 2026 10:50 (30 minutes)

Presenter: Prof. SATO, Joe

Session Classification: Morning session 2

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

Cosmic Neutrino Background Detection with Tritium

Tuesday, 26 May 2026 11:20 (30 minutes)

Presenter: UWABO-NIIBO, Michiru (Institute for Basic Science)

Session Classification: Morning session 2

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

Cosmic Neutrino Background Detection with Tritium

Presenter: UWABO-NIIBO, Michiru (Institute for Basic Science)

Session Classification: Morning session 2

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

Ultimate Quantum Precision Limit at Colliders

Tuesday, 26 May 2026 11:50 (30 minutes)

Presenter: LIU, Jia (Peking University)

Session Classification: Morning session 2

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

Axion inflation with gauged lepton flavor symmetry, large lepton asymmetry, and helium abundance

Tuesday, 26 May 2026 14:00 (30 minutes)

Presenter: KAMADA, Kohei (HIAS UCAS)

Session Classification: Afternoon Session 1

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

Axion inflation with gauged lepton flavor symmetry, large lepton asymmetry, and helium abundance

Presenter: KAMADA, Kohei (HIAS UCAS)

Session Classification: Afternoon Session 1

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

Covariant scalar-tensor theories beyond second derivatives

Tuesday, 26 May 2026 14:30 (30 minutes)

Presenter: PETROV, Pavel (IBS CTPU CGA)

Session Classification: Afternoon Session 1

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

Observing Lorentz-violating effects on the gamma-ray horizon

Tuesday, 26 May 2026 15:00 (30 minutes)

Presenter: NILSSON, Nils Albin (CTPU-CGA, Institute for Basic Science, Korea)

Session Classification: Afternoon Session 1

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

The Impact of String Thickness on GW Spectrum of Cosmic String Network

Tuesday, 26 May 2026 16:00 (20 minutes)

Presenter: HU, Yifan

Session Classification: Afternoon Session 2

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

Multimessenger probes of a complex singlet extension of the Standard Model

Tuesday, 26 May 2026 16:20 (20 minutes)

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

Session Classification: Afternoon Session 2

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

Metastable domain wall in the continuous U(1) group

Tuesday, 26 May 2026 16:40 (20 minutes)

Presenter: TANG, Yi-Lei (中山大学)

Session Classification: Afternoon Session 2

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

Supermassive Primordial Black Holes from a Catalyzed Dark Phase Transition for Little Red Dots

Tuesday, 26 May 2026 17:00 (20 minutes)

Presenter: TANAKA, Masanori (Peking University)

Session Classification: Afternoon Session 2

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

Impostor Among s: Dark Radiation Masquerading as Self-Interacting Neutrinos

Tuesday, 26 May 2026 17:20 (20 minutes)

Presenter: KIM, Taegyun (Southern University of Science and Technology (SUSTech))

Session Classification: Afternoon Session 2

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

Exact pairs in AdS/CFT

Wednesday, 27 May 2026 09:00 (40 minutes)

Presenter: Prof. YANG, Haitang

Session Classification: Morning session 1

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

Curvature-assisted dynamical compactification

Wednesday, 27 May 2026 09:40 (30 minutes)

Presenter: YAMADA, Yusuke (IBS CTPU-CGA)

Session Classification: Morning session 1

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

Curvature-assisted dynamical compactification

Presenter: YAMADA, Yusuke (IBS CTPU-CGA)

Session Classification: Morning session 1

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

Constraints to the higher curvature terms from Cosmology

Wednesday, 27 May 2026 10:10 (30 minutes)

Presenter: Prof. LEE, Bum-Hoon

Session Classification: Morning session 1

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

Recent progresses on $N^*(920)$ and σ resonances

Wednesday, 27 May 2026 11:10 (30 minutes)

Presenter: Prof. XIAO, Zhiguang

Session Classification: Morning session 2

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

Boosted dark matter from galactic and cosmological semi-annihilation

Wednesday, 27 May 2026 11:40 (30 minutes)

Presenter: BETANCOURT KAMENETSKAIA, Boris (Institute for Basic Science CTPU-CGA)

Session Classification: Morning session 2

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

Probing quirk particle at the LHC forward detectors

Wednesday, 27 May 2026 12:10 (30 minutes)

Presenter: LI, Jinmian

Session Classification: Morning session 2

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

Verifiable Origin of Neutrino Masses and Ultra High Energy Astrophysical Neutrinos

Wednesday, 27 May 2026 14:00 (20 minutes)

Presenter: POPOV, Oleg (Shenzhen MSU-BIT University)

Session Classification: Afternoon Session 1

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

Verifiable Origin of Neutrino Masses and Ultra High Energy Astrophysical Neutrinos

Presenter: POPOV, Oleg (Shenzhen MSU-BIT University)

Session Classification: Afternoon Session 1

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

Physical remnant of Electro-weak theta angle

Wednesday, 27 May 2026 14:20 (20 minutes)

Presenter: ZOU, Yingpei

Session Classification: Afternoon Session 1

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

Freeze-in sterile neutrino DM in a feebly gauged – model

Wednesday, 27 May 2026 14:40 (20 minutes)

Presenter: UCHIDA, Yoshiki (Central China Normal University)

Session Classification: Afternoon Session 1