

**Yonsei university Cosmology
and High Energy physics
workshop (YuCHE 2019)**

Report of Contributions

Contribution ID: 1

Type: **not specified**

arrival / reception

Monday, 25 February 2019 17:00 (2 hours)

Contribution ID: 3

Type: **not specified**

Opening: Welcome & Intro.

Tuesday, 26 February 2019 09:30 (30 minutes)

- Welcoming
- Intro to Yonsei U. and Yonsei Physics
- HEP at Yonsei
- Selected recent results from Belle

Presenter: Prof. KWON, YJ

Contribution ID: 4

Type: **not specified**

Studying Gauginos in Supersymmetric Model at Future 100TeV pp Collider

Tuesday, 26 February 2019 10:00 (1 hour)

I discuss a possibility of studying the properties (in particular, masses) of gauginos at future 100TeV pp collider, paying particular attention to the model in which gauginos are within the kinematical reach while the sfermions and Higgsinos are too heavy to be produced at the collider. I first explain that such a mass spectrum can be naturally realized in a class of model called minimal gravity mediation. Then, I discuss procedures to determine gaugino masses at future 100TeV pp collider. I also comment on the possibility to acquire information about more fundamental parameters, like gravitino mass.

Presenter: Prof. MOROI, T

Contribution ID: 5

Type: **not specified**

Flavourful axion phenomenology

Tuesday, 26 February 2019 11:00 (30 minutes)

We provide a comprehensive discussion of the phenomenology of flavourful axions. Presenting the general flavourful axion-fermion and axion-photon coupling, we calculate flavour-violating decays of mesons and leptons involving a flavourful axion. We also derive the mixing between axions and mesons which affects the meson oscillation probability and mass difference, and also contributes to meson decays into axions and axion decays into two photons. These effects may be relevant for ALPs. Finally we describe the phenomenology of a particular “A to Z” Pati-Salam model, in which PQ symmetry arises accidentally due to discrete flavour symmetry. Here all axion couplings are fixed by a fit to flavour data, leading to sharp predictions and correlations between flavour-dependent observables.

Presenter: Prof. CHUN, E.J

Contribution ID: 6

Type: **not specified**

Constraining DM-neutrino interaction with IceCube-170922A

Tuesday, 26 February 2019 11:30 (30 minutes)

Presenter: Prof. CHOI, K.Y

Contribution ID: 7

Type: **not specified**

Flaxion, Axion and Neutron Star.

Tuesday, 26 February 2019 14:00 (1 hour)

Presenter: Prof. HAMAGUCHI, K

Contribution ID: 8

Type: **not specified**

Energetic ALPs From Decaying Dark Matter

Tuesday, 26 February 2019 15:00 (30 minutes)

Presenter: Prof. BAE, KJ

Contribution ID: 9

Type: **not specified**

Unitary inflaton as dark matter and radiation

Tuesday, 26 February 2019 16:00 (30 minutes)

Presenter: Prof. LEE, H.M

Contribution ID: 10

Type: **not specified**

Dark Matter and WIMPY Baryogenesis in Scotogenic Model

Tuesday, 26 February 2019 16:30 (30 minutes)

Presenter: Prof. KANG, S.K

Contribution ID: 11

Type: **not specified**

Murdering the 4th generation 2HDM

Tuesday, 26 February 2019 17:00 (30 minutes)

Presenter: Prof. SONG, J.H

Contribution ID: 12

Type: **not specified**

Light Fermionic WIMP Dark Matter with Light Scalar Mediator

Wednesday, 27 February 2019 10:00 (1 hour)

A light fermionic weakly interacting massive particle (WIMP) dark matter is investigated by studying its minimal renormalizable model, where it requires a scalar mediator to have an interaction between the WIMP and standard model particles. We perform a comprehensive likelihood analysis of the model involving all robust constraints obtained so far and that will be obtained in the near future with paying particular attention to properly take the kinematically equilibrium condition into account. It is shown that near-future experiments and observations such as low-mass direct dark matter detections, flavor experiments and CMB observations play important roles to test the model; however, wide parameter region will still remain survived even if no WIMP and mediator signals are detected there. We also show that precise Higgs boson measurements at future lepton colliders will play a significant role to test this remaining region.

Presenter: Prof. MATSUMOTO, S

Contribution ID: **13**

Type: **not specified**

S8

Wednesday, 27 February 2019 15:00 (30 minutes)

Presenter: Prof. KO, P

Contribution ID: 14

Type: **not specified**

Probing Dark Matter at LIGO and Beyond

Wednesday, 27 February 2019 11:30 (30 minutes)

What can we learn about Dark Matter frontier with Gravitational-Wave (GW) observations at LIGO and future detectors?

We first introduce a new GW observable – GW Fringe – that allows LIGO alone to already probe compact dark matter. We further show that the dark-matter physics potential of GW observation is significantly widened and increased by augmenting LIGO with mid-frequency detectors. New opportunities include searches of fuzzy axion-like dark matter and cosmic strings as well as an ideal localization as a bonus.

Presenter: Prof. JUNG, S.H

Contribution ID: 15

Type: **not specified**

Electroweak baryogenesis driven by an axion like particle.

Wednesday, 27 February 2019 14:00 (30 minutes)

An axion-like particle (ALP) offers a new direction in electroweak baryogenesis because the periodic nature enables it to trigger a strong first-order phase transition even if it is weakly coupled to the Higgs sector. This is essentially because the axion periodicity naturally allows the structure of phase transition to be insensitive to the axion decay constant that determines the strength of axion interactions. Furthermore, the axion can serve as a CP phase relevant to electroweak baryogenesis without causing any problem with respect to the recent measurement of an electron EDM. Depending on the scale of f , non-local or local generation of baryon asymmetry scenarios can be realized. In this talk, I will introduce the basic set-up of the axionic electroweak baryogenesis, and discuss allowed parameter ranges of the axion mass and the implications for future ALP studies.

Presenter: Prof. SHIN, C.S

Contribution ID: 16

Type: **not specified**

Boosted Dark Matter and its Search

Wednesday, 27 February 2019 14:30 (30 minutes)

Can dark matter be produced and travel with relativistic velocities in the current universe?
We answer this question and provide new detection strategies of such relativistic dark matter.

Presenter: Prof. PARK, J.C

Contribution ID: 17

Type: **not specified**

Precision Higgs at the LHC

Wednesday, 27 February 2019 11:00 (30 minutes)

Presenter: Prof. PARK, M.H

Contribution ID: **18**

Type: **not specified**

Closing

Wednesday, 27 February 2019 15:30 (30 minutes)

Presenter: Prof. PARK, S.C

Contribution ID: 19

Type: **not specified**

A model of light dark baryons and dark radiation

Tuesday, 26 February 2019 17:30 (30 minutes)

We propose a model for dark matter and dark radiation, based on a strongly-coupled dark SU(5) gauge theory with fundamental and decuplet dark-quarks. The model supports light dark-baryons, respecting the chiral symmetry, which are electrically neutral but have electromagnetic form factors, and also a light dark-axion. Since the coupling of dark baryons to the standard model particles is inversely proportional to the square of the confinement scale, dark baryons become either hot dark matter or cold dark matter, depending on when the dark color confines. For the confinement scale $\Lambda \sim 10\text{--}10^3$ GeV the dark baryons of mass about 1 GeV–1 MeV become cold dark matter with naturally small magnetic moment and give the correct relic abundance.

Presenter: Prof. HONG, D.K

Contribution ID: **20**

Type: **not specified**

Pictures

Tuesday, 26 February 2019 20:00 (20 minutes)