

CTPU workshop on Particle, String and Cosmology

Report of Contributions

Contribution ID: 0

Type: **not specified**

Landscape of BSM physics scenarios at neutrino oscillation experiments.

Tuesday, 24 November 2020 14:30 (20 minutes)

After the discovery of neutrino oscillation, the focus of the community is now on various fundamental pressing issues such as, the search for leptonic CP-Violation, determination of the ordering of neutrino masses and the precision measurement of the oscillation parameters. Several powerful, high-precision neutrino experiments are in the pipeline to address these issues and these mega-facilities are also sensitive to BSM physics. In this talk, I will give a brief description about how we can probe different BSM physics such as Non-Standard Interaction (NSI) during neutrino propagation, existence of a light sterile neutrino, presence of Lorentz Invariance Violation (LIV) in these upcoming neutrino experiments. I will also discuss how these BSM physics can have significant impact on the measurement of the standard 3-flavour oscillation parameters.

Presenter: MASUD, Mehedi

Contribution ID: 1

Type: **not specified**

De Sitter & String Theory

Tuesday, 24 November 2020 13:00 (20 minutes)

In this talk I will briefly describe some aspects related to de Sitter constructions in string theory, both related to specific string scenarios (in particular the KKLT scenario) as well as conjectural constraints arising within the Swampland program.

Presenter: SOLER, Pablo

Contribution ID: 2

Type: **not specified**

Yukawa Couplings computations for T-branes

Tuesday, 24 November 2020 13:20 (20 minutes)

In a 4D F-theory model, Yukawa couplings can appear in various ways. Generically, triple intersection of 7-branes appear as Yukawa couplings in the 4D effective theory. But this is not the only way. Once there are non-vanishing fields living inside the 7-brane, we may also get Yukawa couplings in the effective theory coming from these bulk fields and/or from the fields living over curves (Riemann surfaces) inside these 7-branes. I use a local Heterotic dual to compute find such fields and to compute their corresponding Yukawa couplings.

Presenter: KARKHEIRAN, Mohsen

Contribution ID: 3

Type: **not specified**

Orbifold and SCFT pairs

Tuesday, 24 November 2020 13:40 (20 minutes)

Cyclic quotient surface singularity isomorphism classes have long been known to come with a natural duality structure, but a distinct orbifold duality not seemingly present in the mathematics literature appears to arise naturally via the interplay between 6D SCFTs and an infinite subset of these same types of orbifolds. We will discuss each of these dualities and the related structures they encode in the SCFT landscape.

Presenter: MERKX, Peter

Contribution ID: 4

Type: **not specified**

Big Bounce Baryogenesis

Tuesday, 24 November 2020 14:50 (20 minutes)

We explore the possibility of an Ekpyrotic contraction phase harbouring a mechanism for Baryogenesis. A Chern-Simons coupling between the fast-rolling Ekpyrotic scalar and the Standard Model Hypercharge gauge field enables the generation of a non-zero helicity during the contraction phase. The baryon number subsequently produced at the Electroweak Phase Transition is consistent with observation for a range of couplings and bounce scales. Simultaneously, the gauge field production during the contraction provides the seeds for galactic magnetic fields and sources gravitational waves, which may provide additional avenues for observational confirmation.

Presenter: BARRIE, Neil

Contribution ID: 5

Type: **not specified**

Model building in Pati-Salam models

Tuesday, 24 November 2020 15:10 (20 minutes)

In this talk, I will briefly introduce my recently working projects related to Pati-Salam unification. The Pati-Salam unification is an attractive candidate for a UV completion of the Standard Model (SM), because the SM quarks and leptons are unified into only two multiplets under the Pati-Salam symmetry, electric charges are quantized and too fast proton decay is not induced by extra gauge/Higgs bosons. I am recently trying to explain baryogenesis consistently with the Yukawa unification, which is a strong prediction from the Pati-Salam symmetry. One possibility is the so-called axiogenesis in which the asymmetry is originated from dynamics of the Peccei-Quinn field. Another possibility is the thermal leptogenesis exploiting the second lightest right-handed neutrino. It has been shown that the leptogenesis by the lightest one is hardly consistent with the Yukawa unification relation. I am also interested in how light leptoquarks in the Pati-Salam gauge group can be, particularly if it can be sufficiently light to explain the recently reported anomalies. The light leptoquarks mean that the Pati-Salam breaking scale is as low as its mass, and hence the Yukawa unification should be hold around TeV-scale. We introduce additional flavors in order to realize the SM flavor structure consistently with the Yukawa unification.

Presenter: KAWAMURA, Junichiro