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

Applications of non-invertible selection rules to flavor physics

Wednesday, 27 August 2025 10:00 (30 minutes)

Selection rules are fundamental principles in quantum systems and quantum field theory, determining whether certain couplings are allowed or forbidden. Conventionally, selection rules are associated with conservation laws originating from a certain group-like symmetry. However, it has been found that non-invertible selection rules also appear in quantum field theory and string theory. In this talk, I will discuss an application of non-invertible selection rules, derived from a fusion algebra, to particle physics, specifically, the flavor structure of quarks and leptons [1,2,3]. I will also introduce such non-invertible selection rules in type II intersecting/magnetized D-brane models [4] and heterotic string theory on Calabi–Yau threefolds [5].

References:
[1] T. Kobayashi, H. Otsuka and M. Tanimoto, Yukawa textures from non-invertible symmetries, JHEP 12 (2024) 117.
[2] T. Kobayashi, Y. Nishioka, H. Otsuka and M. Tanimoto, More about quark Yukawa textures from selection rules without group actions, JHEP 05 (2025) 177.
[3] T. Kobayashi, H. Okada, and H. Otsuka, Radiative neutrino mass models from non-invertible selection rules, 2505.14878 [hep-ph].
[4] T. Kobayashi and H. Otsuka, Non-invertible flavor symmetries in magnetized extra dimensions, JHEP 11 (2024), 120.
[5] J. Dong, T. Kobayashi, R. Nishida, S. Nishimura and H. Otsuka, Coupling Selection Rules in Heterotic Calabi-Yau Compactifications, 2504.09773 [hep-th].

Primary author: OTSUKA, Hajime (Kyushu University)

Presenter: OTSUKA, Hajime (Kyushu University)

Session Classification: Plenary talks (3)