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Classification of Modular Symmetries in Type IIB Flux Landscape

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In this work, we study modular symmetries in type IIB flux landscape by investigating symplectic basis transformations of period vectors on toroidal orbifolds.

To fix explicit cycles of a third-cohomology basis regarding the untwisted complex structure modulus, which is necessary to construct the period vectors, we find that the following two symmetries are required for the period vectors: (i) “Scaling duality” which is a generalized S -transformation of $PSL(2, \mathbb{Z})$ and (ii) the modular symmetries to be consistent with symmetries derived from mass spectra of the closed string in type IIB string theory.

Furthermore, by considering flux quanta on the cycles, we explore type IIB flux vacua on toroidal orientifolds and flux transformations under the modular symmetries of the period vectors.

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