

Pseudo NG bosons from finite modular symmetry

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Pseudo Nambu-Goldstone (pNG) bosons can play important roles in particle physics, such as being a light dark matter (DM), the QCD axion to solve the strong CP problem, and so on. I point out that such a pNG boson is naturally realized by the finite modular symmetry, which may originate from the geometry of extra dimensions in the superstring models. An accidental global $U(1)$ symmetry arises due to the residual Z_N symmetry, when the modulus is stabilized near a fixed point of the finite modular symmetry. To illustrate, I will show the realization of the KSVZ axion model to solve the strong CP problem, where the modulus is stabilized by the radiative potential generated by the vector-like quarks, based on arXiv:2402.02071 (JHEP) and 2405.03996 (JHEP). Since the finite modular symmetries were originally used to explain the flavor structure, this observation suggests that there are non-trivial connections between the pNG mode, which may be the DM, and flavor physics. If time permits, I will discuss the existence of such pNG mode in other stabilization mechanisms and possible applications to particle physics based on 2409.19261 (JHEP) and 2412.18435 (JHEP).

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