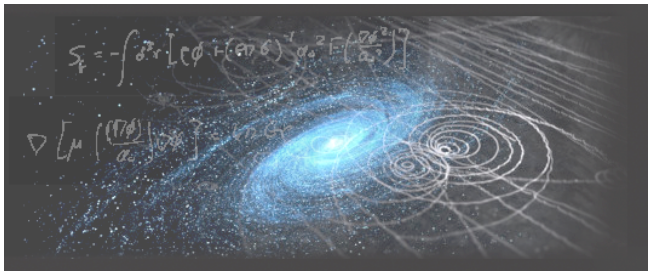

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Orbifold stability of asymptotic GUTs

Monday, 21 October 2024 09:45 (15 minutes)

In the realm of higher-dimensional grand unified theories (GUTs), the technique of orbifolding has emerged as a powerful tool to achieve spontaneous symmetry breaking by geometrical means. We use this tool to analyze the most general 5D GUT models based on the gauge groups SU(N), Sp(2N) and SO(N). We find a new physical consistency requirement, which these models have to satisfy in order to be phenomenologically viable, and which we call orbifold stability. Using the criteria of orbifold stability, as well as requiring the presence of fixed points for gauge and Yukawa couplings, we can discard all unrealistic scenarios, only to find two feasible models:

- one model based on the SU(6) gauge group, which leads to the Standard Model at low energies
- one model based on the SU(8) gauge group, giving rise to Pati-Salam theory below the compactification scale

Summary

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