

Standard Model Baryon Number Violation at Zero Temperature from Higgs Bubble Collisions

Tuesday, September 23, 2025 11:30 AM (30 minutes)

We compute for the first time baryon number violation at zero temperature from Higgs bubble collisions and find that it can be of the same order as that from thermal sphalerons in the symmetric phase at electroweak temperatures. We study the dependence of the rate of Chern–Simons number transitions on the shape of the scalar potential and on the Lorentz factor of the bubble walls at collision via large-scale (3+1)D lattice simulations of the Higgs doublet and SU(2) gauge fields. We estimate the resulting baryon asymmetry assuming some CP-violating source activated by the Higgs-field variation during the phase transition.

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