

Electroweak Baryogenesis via Domain Walls in the N2HDM

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Domain walls are a type of topological defects that can arise in the early universe after the spontaneous breaking of a discrete symmetry. This occurs in several beyond Standard Model theories with an extended Higgs sector such as the Next-to-Two-Higgs-Doublet model (N2HDM).

In this talk I will discuss the ingredients needed for the successful generation of a matter-antimatter asymmetry in the early universe using domain walls related to the singlet scalar of the N2HDM. I will first demonstrate the possibility of restoring the electroweak symmetry in the vicinity of the domain wall leading to an unsuppressed sphaleron rate inside the wall. I also discuss how domain walls in this model can generate CP-violating electroweak vacua localized on the vicinity of the wall which can provide the CP-violation condition for baryogenesis while naturally evading EDM constraints.

This mechanism has the advantage of being independent on the order of the electroweak phase transition as well as evade any EDM constraints on CP-violation.

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