

Strong first order phase transition in composite Higgs models

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We study the strong first order electroweak phase transition (SFOEWPT) with the $SO(6)/SO(5)$ composite Higgs model, whose scalar sector contains one Higgs doublet and one real singlet. Six benchmark models are built with fermion embeddings in 1, 6, and 15 of $SO(6)$. We show that SFOEWPT cannot be triggered under the minimal Higgs potential hypothesis, which assumes the scalar potential is dominated by the form factors from the lightest composite resonances. To get a SFOEWPT, the contributions from local operators induced by physics above the cutoff scale are needed. We take the $6 + 6$ model as an example to investigate the gravitational waves prediction and the related collider phenomenology.

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