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Looking for a SFOEWPT in the RxSM at the HL-LHC and LISA

Thursday 24 October 2024 11:45 (20 minutes)

We explore the real-singlet extension of the Standard Model without a Z2 symmetry (RxSM), as a model to reconstruct the Higgs potental and explain the baryon asymmetry of the Universe. First, we determine regions of parameter space that allow a Strong First-Order Electroweak Phase Transition (SFOEWPT) using the public tools CosmoTransitions and TransitionListener, including also relevant theoretical constraints as well as experimental constraints using HiggsTools. Then, we compute the one-loop corrections to the trilinear Higgs couplings that enter di-Higgs production (hhh and hhH) using the public code anyH3. Finally, we compute the di-Higgs production cross section at the (HL-)LHC in the regions of the RxSM parameter space allowing a SFOEWPT, taking into account the one-loop corrections to the trilinear Higgs couplings. We compare this new result with the results in the SM and in the RxSM at tree level, highlighting the impact of the loop corrections to the trilinear couplings.

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