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Cosmological implications of radiative electroweak symmetry breaking theories

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Radiative symmetry breaking (i.e. classically conformal) theories provide an appealing explanation for electroweak symmetry breaking and address the hierarchy problem. Such theories also imply one or more first-order phase transitions (FOPTs) in the early Universe, deeply affecting the thermal history and potentially providing novel solutions to puzzles of dark matter and baryon asymmetry. This talk performs a detailed analysis of this topic, which includes providing exact and analytical solutions for the vacuum structure and scalar interactions, classifying four patterns of cosmic thermal history, and calculating the supercooled FOPT dynamics and GWs. By combining future collider and gravitational wave experiments, we can probe the conformal symmetry breaking scales up to $10^5 - 10^8$ GeV.

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