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Primordial gravitational waves from sequential electroweak phase transitions

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The first-order electroweak phase transition in the early universe could occur in multiple steps leading to specific multi-peaked signatures in the primordial gravitational wave (GW) spectrum. We argue that these signatures are generic phenomena in multi-scalar extensions of the Standard Model particularly relevant for electroweak baryogenesis. In a simple example of such an extension, we have studied the emergence of reoccurring and nested vacuum bubble configurations and their role in the formation of multiple peaks in the GW spectrum. The conditions for potential detectability of these features by the forthcoming generation of interferometers have been studied.

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