

# Vacuum Stability in the Standard Model and Beyond

*Tuesday 5 November 2024 13:30 (20 minutes)*

We revisit the stability of the Standard Model vacuum, and investigate its quantum effective potential using the highest available precision in theory tools and experimental input parameters to date. We observe that the stability of the electroweak vacuum centrally depends on the values of the top mass and the strong coupling constant and how their uncertainties impact SM vacuum stability. We further investigate vacuum stability for a variety of singlet scalar field extensions with and without flavor using the Higgs portal mechanism. We identify the BSM parameter spaces for stability and find sizable room for new physics. We further study the phenomenology of Planck-safe models at colliders, and determine the impact on the Higgs trilinear, the Higgs-to-electroweak-boson, and the Higgs quartic couplings which can be probed at current and future colliders.

## Primary track

Higgs boson pairs and Higgs potential (including electroweak phase transitions and connections to cosmology)

## Is the speaker a PhD student or post-doc?

Yes - My participation will be fully supported by my research group

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**Session Classification:** Higgs boson pairs and Higgs potential 1 - sal IX

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