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Effects of Inflationary Particle Production on Local Temperature Fluctuations on the CMB

Heavy particle production through coupling with the inflaton field, during inflation, can lead to time-dependent and scale non-invariant curvature perturbations. These perturbations are preserved on superhorizon scales and imprint local temperature deviations, hot and cold spots, in the CMB.
Hot or cold spots can also be a result of tachyonic Higgs production, since the Standard Model Higgs becomes tachyonic and gets exponentially produced out of vacuum during inflation.
We take an in-depth look into potential hot or cold spot relics
in the CMB created by the high particle energy density of the Higgs to see whether these hot or cold spots can be detected. Additionally, we study potential scenarios such as hot or cold spots left by primordial black hole (PBH) production due to the collapse of local overdense Higgs regions.
Using this approach we find the
theoretical limits on the mass functions for Higgs particle production
during the inflationary epoch.

Secondary track

T08 - Higgs Physics

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