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JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Theorie-Palaver

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Lorentz room (Staudingerweg 7, 5th floor)

Daniel Schmitt
Frankfurt U.

Gravitational wave signatures of a supercooled Universe

Theories beyond the Standard Model (BSM) with classical scale invariance predict an intriguing thermal history of the early Universe. Due to the absence of dimensionful terms at tree level in these models, the electroweak phase transition (EWPT) can be significantly delayed, inducing a period of thermal inflation supercooling the Universe. The exit from this supercooled state can then be triggered via different mechanisms, depending on the model parameter space.
In the first part of my talk, I will discuss the end of supercooling via a strong, first-order QCD chiral phase transition. I will outline how the associated gravitational wave (GW) production can be studied within effective QCD theories, with a particular focus on the effect of thermal inflation on the strongly coupled dynamics.
In the second part, I will present an additional option to realize the exit from supercooling: a tachyonic phase transition. Here, the SM quark condensates source an exponential amplification of BSM scalar fields, generating a unique GW background detectable by future observatories.

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