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Higgs dynamics in the early universe

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Stellingen

Behorend bij het proefschrift 'Higgs dynamics in the early universe'

1. Computations of the stability of the electroweak vacuum during reheating are dependent on the renormalization scheme and should therefore be taken with a grain of salt.
Chapter 3 of this thesis.
2. Whenever scalar fields are coupled non-minimally to gravity, a consistent treatment of reheating requires the inclusion of a non-trivial field space metric.
Chapter 4 of this thesis.
3. A light particle that could be responsible for a first order electroweak phase transition could provide CP-violating interactions that are currently impossible to constrain by experiments.
Chapter 6 of this thesis.
4. To explain the baryon asymmetry of the universe, we should focus on CP violation in the lepton sector instead of the quark sector.
Chapter 7 of this thesis.
5. Contrary to the assertion of Clesse and García-Bellido, primordial black holes can not simultaneously explain the LIGO/VIRGO black hole mergers and constitute the entire dark matter fraction.
*S. Clesse and J. García-Bellido, **Phys. Dark. Univ.** 22 (2018) 137-146.*
6. It is remarkable that the independent, local measurement of A. Domínguez et al. yields a value of the Hubble parameter that matches the CMB result.
*A. Domínguez et al., **arXiv:190312097.***

7. The next large particle physics experiment should be a lepton collider, such as the proposed experiment CLIC.
CLICdp and CLIC Collaborations (T.K. Charles et al.), CERN Yellow Rep. Monogr. 1802 (2018) 1-98.
8. It is interesting that the addition of an R^2 -term solves the unitarity issues of Higgs inflation, while maintaining the connection between the CMB observables and Standard Model Higgs parameters.
D. Gorbunov and A. Tokareva, Phys. Lett. B788 (2019) 37-41.
9. In order to decrease the number of flights, the physics community should experiment with conferences that take place completely online.

Jorinde van de Vis
Leiden, 2 July 2019