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Gravitational effects on particle decay

The presence of a gravitational field modifies significantly particle decay rates compared to the usual Minkowski space results. Because of the lack of energy conservation, new particle processes, forbidden in Minkowski space, are to be considered leading to new Feynman diagrams even at first order. I will give a brief introduction to the problems encountered when trying to calculate decay rates using quantum field theory in curved spacetime in FLRW-spacetimes. I will focus on conceptual issues, show methods of calculation to overcome some of these issues and present some recent results when these decay rates are applied to a reheating scenario in inflation epoch via gravitational particle creation.

Based on:

arXiv:1805.09620

arXiv:1904.05084

arXiv:1910.07520

Primary author: Mr LANKINEN, Juho (University of Turku)

Presenter: Mr LANKINEN, Juho (University of Turku)

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