



Contribution ID: 30

Type: **Talk/Seminar**

Decaying Massive Scalar in the Early Universe

Wednesday 25 September 2019 12:00 (20 minutes)

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 one encounters 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 few explicit results of modified decay rates which show that in the early Universe a massive scalar particle tends to decay into fermionic rather than to scalar channel.

Based on:

arXiv:1805.09620

arXiv:1904.05084

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Session Classification: Student's Talks

Track Classification: Student's talks