

M2 Internship proposal at CPT

Research team:

Particle Theory

Supervisor:

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Project title:

Beyond freeze out: phenomenology of hidden sector DM models

Description:

The tremendous progress in direct and indirect detection limits on the nature of dark matter has started to put the standard picture of the freeze out of WIMPs in question. Here we will consider a simple model where the dark matter particle interacts with the SM via a mediator (e.g. scalar, pseudoscalar, vector). The 4-month project will involve studying non-standard DM generation mechanisms beyond Freeze out, finding previously unexplored regions of the parameter space where the correct relic abundance can be created. (For a review of dark matter see 1705.01987, 1910.05610). We would further focus on the possibilities to constrain such models at the LHC. This would naturally lead to a PhD thesis.

References:

- The Four Basic Ways of Creating Dark Matter Through a Portal
By Xiaoyong Chu, Thomas Hambye, Michel H.G. Tytgat.
JCAP 1205 (2012) 034 [arXiv:1112.0493 [hep-ph]].
- ‘Dark matter from dark photons: a taxonomy of dark matter production
T. Hambye, M. H. G. Tytgat, J. Vandecasteele and L. Vanderheyden,
Phys. Rev. D **100** (2019) no.9, 095018 [arXiv:1908.09864 [hep-ph]].
- Revised constraints and Belle II sensitivity for visible and invisible axion-like particles
By Matthew J. Dolan, Torben Ferber, Christopher Hearty, Felix Kahlhoefer, Kai Schmidt-Hoberg.
arXiv:1709.00009 [hep-ph].