Phenomenology 2022 Symposium: From Virtual to Real



Contribution ID: 49

Type: not specified

Bound state effects on dark matter coannihilation pushing the boundaries of t-channel mediator models

Tuesday 10 May 2022 17:30 (15 minutes)

Bound-state formation effects can have a large impact on the dynamics of dark matter freeze-out in the early Universe, in particular, for colored coannihilators. We present a general formalism to include an arbitrary number of excitations of bound states in terms of an effective annihilation cross section. For a coannihilator in the fundamental representation of SU(3)c, we discuss radiative bound-state formation, decay, and electromagnetic transition rates among them. We then assess the impact of bound states within a model with Majorana dark matter and a colored scalar t-channel mediator. We consider the regime of coannihilation as well as conversion-driven freeze-out (or coscattering), where the relic abundance is set by the freeze-out of conversion processes. We find that the latter region is considerably enhanced due to bound-state effects with far-reaching implications for search strategies at the upcoming LHC runs.

Authors: HEISIG, Jan (Université catholique de Louvain (UCL)); GARNY, Mathias (Technische Universitaet Muenchen (DE))

Presenter: HEISIG, Jan (Université catholique de Louvain (UCL))

Session Classification: DM VI