



Contribution ID: 48

Type: **not specified**

## Impact of bound states on non-thermal dark matter production

*Thursday 28 July 2022 11:36 (18 minutes)*

In this talk I will discuss the influence of non-perturbative effects, namely Sommerfeld enhancement and bound state formation, on the cosmological production of non-thermal dark matter (DM). For this purpose, I will focus on a class of simplified models with t-channel mediators. These naturally combine the requirements for large corrections in the early Universe, i.e. beyond the Standard Model states with long range interactions, with a sizable new physics production cross section at the LHC. I will show that the dark matter yield of the superWIMP mechanism is suppressed considerably due to the non-perturbative effects under consideration, which leads to a significant shift in the cosmologically preferred parameter space of non-thermal dark matter in these models. By revisiting the implications of LHC bounds on long-lived particles associated with non-thermal dark matter, I will conclude that testing this broad class of DM models at the LHC and its successors is a bigger challenge than previously anticipated.

**Primary authors:** BOLLIG, Julian; Prof. VOGL, Stefan (Freiburg University)

**Presenter:** BOLLIG, Julian

**Session Classification:** Parallel Session A

**Track Classification:** Astroparticle physics