



Contribution ID: 27

Type: **not specified**

Effective Theory of Freeze-in Dark Matter

Thursday 24 September 2020 09:40 (20 minutes)

We perform a model independent study of freeze-in of massive particle dark matter (DM) by adopting an effective field theory framework. Considering the dark matter to be a gauge singlet Majorana fermion, odd under a stabilising symmetry Z_2 under which all standard model (SM) fields are even, we write down all possible DM-SM operators upto and including mass dimension eight. For simplicity of the numerical analysis we restrict ourselves only to the scalar operators in SM as well as in the dark sector. We calculate the DM abundance for each such dimension of operator considering both UV and IR freeze-in contributions which can arise before and after the electroweak symmetry breaking respectively. After constraining the cut-off scale and reheat temperature of the universe from the requirement of correct DM relic abundance, we also study the possibility of connecting the origin of neutrino mass to the same cut-off scale by virtue of lepton number violating Weinberg operators. We thus compare the bounds on such cut-off scale and corresponding reheat temperature required for UV freeze-in from the origin of light neutrino mass as well as from the requirement of correct DM relic abundance. We also briefly comment upon the possibilities of realising such DM-SM effective operators in a UV complete model.

Authors: BARMAN, Basabendu; Dr BORAH, Debasish (Indian Institute of Technology Guwahati); ROSHAN, Rishav (Indian Institute of Technology Guwahati)

Presenter: BARMAN, Basabendu

Session Classification: CoCo