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The moduli portal to dark matter particles. (English) Zbl 07387955

Summary: The out-of-equilibrium production of dark matter (DM) from standard model (SM) species in the early universe (freeze-in mechanism) is expected in many scenarios in which very heavy beyond the SM fields act as mediators. In this conference, I have talked about the freeze-in of scalar, fermionic, and vector DM through the exchange of moduli fields [D. Chowdhury et al. Phys Rev D 99, No. 9, ArticleID 095028, 11 p. (2019; doi:10.1103/PhysRevD.99.095028)], which are in the low-energy spectrum of many extra-dimensions and string theory frameworks. We have shown that the high temperature dependencies of the production rate densities in this model, as well as the possibility of having moduli masses at the post-inflationary reheating scale, make it crucial to consider the contribution of the freeze-in prior the start of the standard radiation era for a correct prediction of the DM relic density. For the entire collection see [Zbl 07262210].

MSC:
83C56 Dark matter and dark energy
81V22 Unified quantum theories
83F05 Relativistic cosmology
14D21 Applications of vector bundles and moduli spaces in mathematical physics (twistor theory, instantons, quantum field theory)
83E15 Kaluza-Klein and other higher-dimensional theories

Keywords:
dark matter; moduli fields; freeze-in production

Full Text: DOI

References: