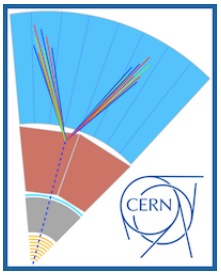

Contribution ID: **18** Type: **not specified**

Freeze-in sterile neutrino dark matter in feeble gauged $B - L$ model

Tuesday 2 July 2024 09:50 (20 minutes)

We consider the gauged $U(1)_{B-L}$ model and examine the situation where the sterile neutrino becomes a dark matter candidate by the freeze-in mechanism. In our model, the dark matter N is mainly produced by the decay of a $U(1)_{B-L}$ breaking scalar field ϕ. We point out that the on-shell production of ϕ through annihilation of the $U(1)_{B-L}$ gauge field Z' plays an important role. We find that the single production of Z' from the photon bath is one of the main production processes of Z'. To prevent N from being overproduced, we show that the $U(1)_{B-L}$ gauge coupling constant g_{B-L} must be as small as 10^{-13}–10^{-10}. We also consider the case where the decay of ϕ into N is kinematically forbidden. In this case, N is generated by the scattering of Z' and the g_{B-L} takes values of 10^{-7}–10^{-6}, which can be explored in collider experiments like FASER.

Author: SHIMOMURA, Takashi

Co-authors: SETO, Osamu (Hokkaido University); UCHIDA, Yoshiki (South China Normal University)

Presenter: SHIMOMURA, Takashi

Session Classification: Theory and phenomenology