Contribution ID: **218** Type: **not specified**

Pseudo-Nambu-Goldstone Dark Matter Model Inspired by Grand Unification

Tuesday, 24 August 2021 11:15 (20 minutes)

A pseudo-Nambu-Goldstone boson (pNGB) is an attractive candidate for dark matter due to the simple evasion of the current severe limits of dark matter direct detection experiments. One of the pNGB dark matter models has been proposed based on a gauged U(1) B–L symmetry. The pNGB has long enough lifetime to be a dark matter and thermal relic abundance can be fit with the observed value against the constraints on the dark matter decays from the cosmic-ray observations. The pNGB dark matter model can be embedded into an SO(10) grand unified theory, whose SO(10) is broken to the Pati-Salam gauge group at the unified scale, and further to the Standard Model gauge group at the intermediate scale. Unlike the previous pNGB dark matter model, the parameters such as the gauge coupling constants and the gauge kinetic mixing are determined by solving the renormalization group equations for gauge coupling constants with appropriate matching conditions. From the constraints of the dark matter lifetime and gamma-ray observations, the pNGB dark matter mass must be less than O(100) GeV. We find that the thermal relic abundance can be consistent with all the constraints when the dark matter mass is close to half of the CP even Higg masses.

Primary authors: TSUMURA, Koji (Kyushu University); YAMATSU, Naoki (Kyushu University); Dr TOMA, Takashi (Kanazawa University); ABE, Yoshihiko (Kyoto University)

Presenter: Dr TOMA, Takashi (Kanazawa University)

Session Classification: Dark Matter and Astroparticle Physics

Track Classification: Dark Matter and Astroparticle Physics