## Phenomenology 2016 Symposium



Contribution ID: 40

Type: parallel talk

## $Z'_{BL}$ portal dark matter and LHC Run-2 results

Tuesday 10 May 2016 18:00 (15 minutes)

We consider a concise dark matter scenario in the minimal gauged B - L extension of the Standard Model (SM), where the global B - L (baryon number minus lepton number) symmetry in the SM is gauged, and three generations of right-handed neutrinos and a B - L Higgs field are introduced. Associated with the B - L gauge symmetry breaking by a VEV of the B - L Higgs field, the seesaw mechanism for generating the neutrino mass is automatically implemented after the electroweak symmetry breaking in the SM. In this model context, we introduce a  $\mathbb{Z}_2$  -parity and assign an odd parity for one right-handed neutrino while even parities for the other fields. Therefore, the dark matter candidate is identified as the right-handed Majorana neutrino with odd  $Z_2$  parity, keeping the minimality of the particle content intact. When the dark matter particle communicates with the SM particles mainly through the B - L gauge boson ( $Z'_{BL}$  boson), its relic abundance is determined by only three free parameters, the B - L gauge coupling ( $\alpha_{BL}$ ), the  $Z'_{BL}$  boson mass  $(m_{Z'})$  and the dark matter mass  $(m_{DM})$ . With the cosmological upper bound on the dark matter relic abundance we find a lower bound on  $\alpha_{BL}$  as a function of  $m_{Z'}$ . On the other hand, we interpret the recent LHC Run-2 results on search for Z' boson resonance to an upper bound on  $\alpha_{BL}$  as a function of  $m_{Z'}$ . Combining the two results we identify an allowed parameter region for this " $Z'_{BL}$  portal" dark matter scenario, which turns out to be a narrow window with the lower mass bound of  $m_{Z'} > 2.5$  TeV.

## Summary

Author: Ms OKADA, Satomi (Yamagata University)
Co-author: Prof. OKADA, Nobuchika (University of Alabama)
Presenter: Ms OKADA, Satomi (Yamagata University)
Session Classification: Dark Matter III