Contribution ID: **93** Type: **Oral**

Gamma-ray from Dark Matter Annihilation in Three-loop Radiative Neutrino Mass Generation Models

Monday 2 December 2019 17:30 (15 minutes)

We study the Sommerfeld enhanced Dark Matter (DM) annihilation into gamma-ray for a class of three-loop radiative neutrino mass models with large electroweak multiplets where the DM mass is in the TeV range. We show that in this model, the DM annihilation rate becomes more prominent for larger multiplets, and it is already within reach of the currently operating Imaging Atmospheric Cherenkov telescopes (IACTs), High Energy Stereoscopic System (H.E.S.S.). Furthermore, we investigate the prospect of constraining such model with very high energy gamma-ray observation from the Galactic center with future Cherenkov Telescope Array (CTA) which will have improved sensitivity by a factor of $\mathcal{O}(10)$ compared to present IACTs. We find that the CTA will exclude a large portion of the parameter space of the three-loop radiative neutrino mass model with larger electroweak multiplets. This result implies that the only viable option for the model is the lowest electroweak multiplet, i.e. the singlet of $SU(2)_L$ where the DM annihilation rate is not Sommerfeld enhanced, and hence it is not yet constrained by the indirect detection limits from H.E.S.S. or future CTA. (Based on Physics Letters B, Vol. 782, pp. 215-223 (2018) and arXiV:1710.xxxxx)

Author: CHOWDHURY, Talal Ahmed (University of Dhaka)

Co-author: Prof. NASRI, Salah (UAE University)

Presenter: CHOWDHURY, Talal Ahmed (University of Dhaka)

Session Classification: Parallel

Track Classification: Dark matter