Contribution ID: **113** Type: **not specified**

From Dirac neutrino masses to baryonic and dark matter asymmetries

Thursday, 27 September 2012 15:00 (20 minutes)

In this talk I will introduce a unified picture of Dirac neutrino masses, baryon asymmetry and dark matter relic density. Specifically, we consider an $SU(3)'_c \times SU(2)'_L \times U(1)'_Y$ dark sector, parallel to the $SU(3)_c \times SU(2)_L \times U(1)_Y$ ordinary sector. The hypercharges, baryon numbers and lepton numbers in the dark sector are opposite to those in the ordinary sector. We further introduce three types of messenger sectors: (i) two or more gauge-singlet Dirac fermions, (ii) two or more $[SU(2)_L \times SU(2)'_L]$-bidoublet Higgs scalars, (iii) at least one gauge-singlet Dirac fermion and at least one $[SU(2)_L \times SU(2)'_L]$-bidoublet Higgs scalar. The lepton number conserving decays of the heavy fermion singlet(s) and/or Higgs bidoublet(s) can simultaneously generate a lepton asymmetry in the $[SU(2)_L]$-doublet leptons and an opposite lepton asymmetry in the $[SU(2)'_L]$-doublet leptons to account for the cosmological baryon asymmetry and dark matter relic density, respectively. The dark proton and/or neutron as the dark matter particle thus should have a mass about $5\,\mathrm{GeV}$. By integrating out the heavy fermion singlet(s) and/or Higgs bidoublet(s), we can obtain three light Dirac neutrinos composed of the ordinary and dark left-handed neutrinos. If a mirror symmetry is further imposed, our models will not require more parameters than the traditional type-I, type-II or type-I+II seesaw models.

Primary author: Dr GU, Peihong (Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg, Germany)

Presenter: Dr GU, Peihong (Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg, Germany)

Session Classification: Parallel Session 2: Cosmology & Astroparticle Physics

Track Classification: Cosmology & Astroparticle Physics