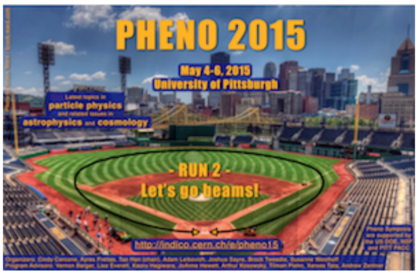


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# Dark matter explained through two distinct ideas related to Higgs

*Tuesday 5 May 2015 18:00 (15 minutes)*

The existence of dark matter is now well established fact. In this talk, I will talk about two distinct possibilities of dark matter. In the first case, the dark matter is assumed to be the ordinary matter in a "parallel Universe" . Our Universe and the parallel Universe are described by their own nonabelian gauge symmetries which forbid any kinetic mixing between them. However, the quartic Higgs interactions involving Higgs fields between the two Universes are allowed by the symmetries of the model. The ensuing mixing between the two lightest Standard Model like Higgses gives rise to interesting signatures at the proposed international electron-positron collider (ILC) specially in the case when mass splitting between the two surviving light Higgs bosons are small ( ~ 100 MeV) so that they cannot be resolved at the LHC. In the totally different scenario, we show that a neutral scalar field, $\sigma$, of two Higgs doublet extensions of the Standard Model incorporating the seesaw mechanism for neutrino masses can be identified as a consistent *warm* dark matter candidate with a mass of order keV. The relic density of σ is correctly reproduced by virtue of the late decay of a right-handed neutrino N participating in the seesaw mechanism. Constraints from cosmology determine the mass and lifetime of N to be M_N = 25 GeV - 20 TeV and $\tau_N$ = (10ˆ{-4} - 1) sec. This model can also explain the 3.5 keV X-ray anomaly in the extra-galactic spectrum that has been recently reported in terms of the decay $\sigma \to \gamma\,\gamma$.

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