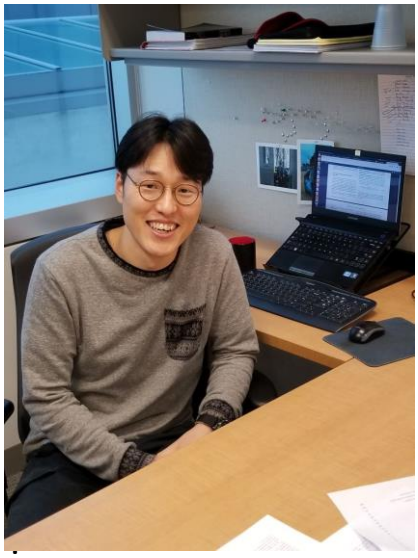
LABORATORY FOR ELEMENTARY-PARTICLE PHYSICS (LEPP)

Theory Seminar



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Dirac neutrino from clockwork and its phenomenology

While neutrino oscillation data reveals that neutrinos in the Standard Model (SM) are massive, precise nature (Dirac or Majorana) and underlying generating mechanism are still yet to be uncovered. A plethora of studies has been focused mainly on a class of "seesaw" models that render "Majorana" mass for SM neutrinos. Relatively much less exploration has been made with regard to the possibility of "Dirac" neutrino, mainly due to theoretical challenges in getting naturally small Dirac mass. In this talk, I will introduce clockwork mechanism as a general field theoretic construction to generate exponentially small couplings and apply one version of it to account for naturally small Dirac mass for SM neutrinos. In general, obtaining analytic results for the mass spectrum and couplings in clockwork theories are rather difficult. However, I will show that in our model, 1/N-type perturbative expansion exists, allowing us to achieve approximate analytic results. Equipped with spectrum and couplings, I will then discuss constraints on the theory parameter space from Electroweak Precision observables and flavor physics. Finally, I will discuss briefly the form of physics beyond the SM (BSM) offered by the model and the prospects for probing them at current and future colliders.

Wednesday, Sept 19, 2018
2:00pm
401 Physical Sciences Building