

PARTICLE PHYSICS SEMINAR SERIES

Higgs and Dark Matter: Absence of Evidence ! = Evidence of Absence?

Prof. Nausheen Shah

Wayne State University

Wednesday, February 6

4:00 pm - Rm 415 NSH

Since the Higgs discovery in 2012, the LHC has not found any conclusive evidence for the presence of New Physics (NP) at the weak scale. While there are stringent limits on strongly interacting NP, the weakly interacting sector is minimally constrained. In addition, dark matter direct detection experiments have been putting increasingly stringent bounds on the cross sections of dark matter particles scattering off nuclei. This has led to wide spread pessimism regarding the WIMP paradigm and most well studied SUSY models such as the MSSM or the NMSSM. I take a different view point. What if the lack of evidence, instead of being due to absence of NP at the weak scale, is actually telling us where NP could be hiding? In that spirit I will discuss the implications for an extended Higgs sector of a SM-like Higgs in generic 2HDMs+, using the NMSSM as motivation. Next I will talk about the possible connections of 2HDMs with dark matter using an EFT formulation, particularly focusing on the connotations of null signals in direct detection experiments. Finally, I will discuss some tantalizing recent results from electroweakino searches at the LHC, showing how these may be consistent with astrophysical observations, and fit naturally in the MSSM/NMSSM setup.



PHYSICS