

KMI Colloquium

An experiment for Hidden Sector exploration at the SPS



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Wednesday, 27th April, 17:00-
KMI Science Symposia (ES635)

Abstract:

Given the apparent validity of the Standard Model (SM) and the lack of unambiguous experimental hints for the scale of new physics, it is as plausible to assume that the shortcomings of the SM may have their origin in new physics involving no new scale but instead very weakly interacting particles as predicted by models of portals to a Hidden Sector with heavy Majorana leptons, dark photons etc. Even in BSM scenarios associated with high mass scales such as SUSY, many models contain light particles with suppressed couplings.

After reviewing briefly the status of the search for hidden particles at the GeV-scale at past and current experiments, the talk will focus on the recent proposal for a new type of intensity frontier experiment at the CERN SPS accelerator. Thanks to the high power of the SPS, the Search for Hidden Particles (SHiP) experiment is able to search for any type of hidden particles with masses from sub-GeV up to $O(10)$ GeV with super weak couplings down to 10^{-10} , and thereby access a significant fraction of the unexplored parameter space which is consistent with cosmological constraints. As a by-product of the optimization of the experimental facility for hidden particle search, it is also ideally suited for studying the interactions of tau neutrinos.

