

“Search for Hidden Sector Scalar Bosons in $X \rightarrow \gamma\gamma$ channel with tagged photon beam in Hall B”

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Abstract

In the light of new physics extensions of the Standard Model and a variety of recent indications of the possible existence of a hidden sector light boson, we propose to perform an experiment to search for neutral hidden scalar bosons in the [10–80] MeV invariant mass range. The Hall B photon tagger, modified to operate with 11.5 GeV electron beams, will be used to produce these neutral, yet unknown, particles. The multi-gamma decays of these objects ($X \rightarrow \gamma\gamma$) will be detected by a high resolution and high acceptance crystal calorimeter, based on the existing HyCal PbWO_4 calorimeter. This technique will provide a sub-MeV level resolution in the proposed two-photon invariant mass range. In this talk the motivation, feasibility studies of the setup, and conceptual design of the proposed experiment will be presented.