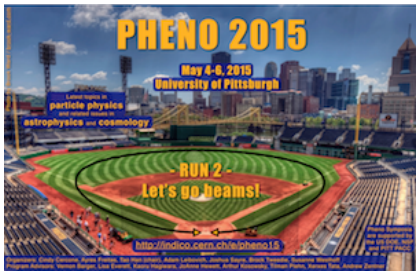

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Uncovering light scalars with exotic Higgs decays to bbmumu

Monday, May 4, 2015 6:00 PM (15 minutes)

The search for exotic Higgs decays are an essential probe of new physics. The small width of the Higgs boson makes its decay uniquely sensitive to the existence of light hidden sectors. We assess the potential of an exotic Higgs decay search for h -> 2X -> bbmumu to constrain theories with light CP-even and CP-odd singlet scalars. This decay arises naturally in many scenarios, such as the Standard Model augmented with a singlet, the two-Higgs-doublet model with a singlet (2HDM+S) – which includes the Next-to-Minimal Supersymmetric Standard Model (NMSSM) – and in hidden valley models. The 2b2mu channel may represent the best discovery avenue for many models. It has competitive reach, and is less reliant on low-pT b- and tau-reconstruction compared to other channels like 4b, 4tau, and 2tau2mu. We analyze the sensitivity of a 2b2mu search for the 8 and 14 TeV LHC, including the HL-LHC and find that Br(h -> 2X -> 2b2mu) can be constrained at the few x 10ˆ-5 level at the HL-LHC.

Primary authors: CURTIN, David (University of Maryland); ESSIG, Rouven (S); ZHONG, Yiming (Stony Brook University)

Presenter: ZHONG, Yiming (Stony Brook University)

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