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Using the Higgs as a portal to the ”hidden sector”

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Abstract content
   (Max 300 words)

The ATLAS experiment at the Large Hadron Collider at CERN provides an opportunity for studying the physics of the Standard Model (SM) and beyond. In particular, one may search the so called “hidden sector” for a possible new neutral boson which could be revealed by the study of the decay of the recently discovered Higgs-like boson or alternatively any other as yet undiscovered Higgs boson. The search is motivated by theoretical models which predict that this hidden sector Higgs is accompanied by new (non SM) gauge bosons, which are observable through mixing with SM Higgs. The well studied “golden” channel for the Higgs is H -> ZZ -> 4l (where l can either be an electron or a muon). This is the basis of the investigation, which is represented as H -> Z’Z‘ -> 4l. The Z’ represents the new gauge boson in the hidden sector and its mass is as yet unconstrained and could be quite low. Because of its low mass and the weak coupling to fermions, the Z’ decays into SM fermions (leptons or light quarks) with a significant branching ratio and narrow width. This talk discusses the phenomenology of this channel using published ATLAS data as well as the strategy for the search which is still in progress.

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