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Search for rare and lepton-flavor-violating Higgs boson decays at the ATLAS experiment

The Standard Model predicts several rare decay processes of the Higgs boson, including decay to a Z boson and a photon ($H \rightarrow Z\gamma$), decay to a pair of muons ($H \rightarrow \mu\mu$), and decay to a pair of electrons ($H \rightarrow ee$). The lepton-flavor-violating (LFV) decay of the Higgs boson, on the other hand, is forbidden in the Standard Model but allowed in new physics models. Search for rare and LFV decays of the Higgs boson could provide a stringent test of SM and serve as a powerful probe to new physics. This talk will present several results for Higgs boson rare decay searches based on LHC Run 2 and Run 3 data.

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