

# Identical particle and lepton mass effects in the decay of the Higgs boson into four tau leptons via two off-shell $Z$ bosons

Stefan Groote, Lauri Kaldamäe and Maria Naeem

Institute of Physics, University of Tartu, W. Ostwaldi 1, 50411 Tartu, Estonia

E-mail of presenter: maria.naeem@ut.ee

We consider identical particle and lepton mass effects in the cascade decay of the Higgs boson into two off-shell  $Z$  bosons, followed by the decay of each of those into a pair of tau lepton and antilepton. We also consider subordinate leading order decays with the same final state. Since the scale of the problem is set by the off-shellness of the respective gauge bosons and not by the Higgs boson mass, lepton mass effects are nonnegligible in particular close to the threshold of the off-shell decays. We calculate the rates and single angle decay distributions and compare them with the corresponding rates and single angle decay distributions for the decay into electrons and muons.

## Reference

1. S. Groote, L. Kaldamäe, M. Naeem, “Identical particle and lepton mass effects in the decay  $H \rightarrow Z^*(\rightarrow \tau^+\tau^-) + Z^*(\rightarrow \tau^+\tau^-)$ ”, e-Print: 2206.05901 [hep-ph]



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