

Higgs boson decay to charmonia via c -quark fragmentation

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We calculate the decay branching fractions of the Higgs boson to J/ψ and η_c via the charm-quark fragmentation mechanism for the color-singlet and color-octet states in the framework of non-relativistic QCD.

The decay rates are governed by the charm-quark Yukawa coupling, unlike the decay $H \rightarrow J/\psi + \gamma$, which is dominated by the γ^* - J/ψ mixing.

We find that the decay branching fractions can be about 2×10^{-5} for $H \rightarrow c\bar{c} + J/\psi$, and 6×10^{-5} for $H \rightarrow c\bar{c} + \eta_c$. We comment on the perspective of searching for the Higgs boson to J/ψ transition at the High-Luminosity LHC for testing the charm-quark Yukawa coupling.

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