

Systematic studies of isospin-violating transitions in charmonium with BESIII

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Collaboration

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Abstract content

Isospin symmetry, to a good approximation, is preserved by the strong interaction due to the small mass difference between up and down quarks with respect to the mass of hadrons. Therefore, isospin-breaking decays are believed to be sensitive probes that can be used to access, for example, the up- and down-quark mass differences. Moreover, isospin breaking effects are considered as a signature for identifying exotic states of matter, such as the $X(3872)$. Charmonium is an excellent system to study pure hadronic effects that lead to isospin breaking, since the contribution of electromagnetic processes is shown to be small compared to the quark-mass difference. We will report on systematic studies of isospin-suppressed transitions in charmonium performed by the BESIII collaboration. Measurements of the branching fractions of transitions $\psi(2S) \rightarrow \pi^0 J/\psi(h_c)$ and $\chi_{c0,2} \rightarrow \pi^0 \eta_c$, will be presented and interpreted using different theoretical approaches.

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