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Partial Wave Analysis of J/ψ Decays into ρρπ

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Abstract: The possible place to search for exotic states in J/ψ hadronic decays is in J/ψ→ρρπ. Because of the symmetry of identical particle and the symmetry of isospin, the physical analysis on this channel is quite complicated. In this paper, the method to use the partial wave analysis based on covariant helicity amplitude analysis to study the invariant mass spectrum of ρπ and to find the evidence of exotic states in ρπ spectrum is discussed. The decay amplitude for the decay sequence J/ψ→ρX, X→ρπ is given first. Then we discuss how to realize the identical particle symmetry and the isospin symmetry in the decay amplitude, which is the key point in the analysis of this channel. Then the total decay amplitude of this channel including all decay components is given. After that, how to identify the exotic states in the ρπ spectrum is discussed. What is discussed in this paper is the theoretical basis on experimentally searching for exotic states at BEPC/BES.

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