

## Re-study of Nucleon Pole Contribution in $J/\psi \rightarrow N\bar{N}\pi$ Decay

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**Abstract:** We re-study nucleon pole contribution in  $J/\psi \rightarrow N\bar{N}\pi$  decays by including the imaginary part for the propagator of the off-shell nucleon with energy above  $\pi N$  threshold. It is found that when including the imaginary part in the propagator, the branching ratio of the decay width will descend about 11% compared with the result without including the imaginary part, no matter whether including the off-shell form factors or not. It also leads to a phase of up to  $25^\circ$  for the off-shell nucleon propagator at invariant mass around 1400 MeV. This effect needs to be considered for detailed partial wave analysis of  $N^*$  resonances around this mass region.

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