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# Wave-Packet Effects: A Solution for Isospin Anomalies in Vector-Meson Decay

Tuesday 19 December 2023 11:00 (30 minutes)

There is a long-standing anomaly in the ratio of the decay width for  $\psi(3770) \rightarrow D^0 \overline{D^0}$  to that for  $\psi(3770) \rightarrow D^+ D^-$  at the level of 9.5  $\sigma$ . A similar anomaly exists for the ratio of  $\phi(1020) \rightarrow K_{\rm L}^0 K_{\rm S}^0$  to  $\phi(1020) \rightarrow K^+ K^-$  at 2.1  $\sigma$ . In this study, we reassess the anomaly through the lens of Gaussian wave-packet formalism. Our comprehensive calculations include the localisation of the overlap of the wave packets near the mass thresholds as well as the composite nature of the initial-state vector mesons. The results align within  $\sim 1\sigma$  confidence level with the Particle Data Group's central values for a physically reasonable value of the form-factor parameter, indicating a resolution to these anomalies. We also check the deviation of a wave-packet resonance from the Briet-Wigner shape and find that wide ranges of the wave-packet size are consistent with the experimental data.

### Designation

Faculty

## **Reference** publication/preprint

arXiv:2308.09933 [hep-ph], Accepted for publication in EPJC

#### Institution

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