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The $\tau^- \to \pi^-\omega\nu_\tau$ Spectral function and its impact on $\tau^- \to \pi^-\pi^0\nu_\tau\gamma$

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We describe the $\omega\pi$ spectral function, measured in the decay $\tau^- \to \pi^-\omega\nu_\tau$ by the CLEO Collaboration, using an importance sampling procedure to explicitly account for the correlation between the parameters of the corresponding form factor. We exhibit the improvement in the uncertainties, compared to the uncorrelated case, and show the agreement with the expected from the measurement of the cross section of $e^+e^- \to \omega\pi$ by SND experiment, which validates the conserved vector current (CVC) hipothesis. The generated data set of the parameters is used to compute the branching ratio of the decay, which is found to be consistent with the reported value by the PDG.
As an application, we consider the ω-channel of the $\tau^- \to \pi^-\pi^0\nu_\tau\gamma$ process, the leading model dependent contribution in the vector meson dominance approach. We compute the contribution to the long distance electromagnetic correction function $G_{em}(t)$, of the pure ω-channel and its interference with the structure independent part.
We show that the uncertainties using the set of correlated parameters are largely reduced with respect to the uncorrelated case. The implication on the isospin symmetry breaking correction to the muon magnetic dipole moment estimation from tau data is exhibited.

Academic position of the presenting author

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