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Combined analysis of the decays τ−⟶KSπ−ντ and τ−⟶K−ηντ

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In a combined study of the decay spectra of τ−⟶KSπ−ντ and τ−⟶K−ηντ decays within a dispersive representation of the required form factors, we illustrate how the K∗(1410) resonance parameters, defined through the pole position in the complex plane, can be extracted with improved precision as compared to previous studies. While we obtain a substantial improvement in the mass, the uncertainty in the width is only slightly reduced, with the findings $M_{K∗'} = 1304 \pm 17$ MeV and $\Gamma_{K∗'} = 171 \pm 62$ MeV. Further constraints on the width could result from updated analyses of the Kπ and/or Kη spectra using the full Belle-I data sample. Prospects for Belle-II are also discussed. As the K−π0 vector form factor enters the description of the decay τ−⟶K−ηντ, we are in a position to investigate isospin violations in its parameters like the form factor slopes. In this respect also making available the spectrum of the transition τ−⟶K−π0ντ would be extremely useful, as it would allow to study those isospin violations with much higher precision.

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