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Charmonium resonances from 2+1 flavor CLS lattices

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Properties of resonances and excited states near decay thresholds are encoded in hadronic scattering amplitudes, which can be extracted from the finite volume spectrum using (extensions of) Lueschers method. We discuss how to reliably extract the finite volume spectrum above strong-interaction decay thresholds from lattice QCD simulations. Preliminary results for such spectra in various frames and lattice irreducible representations on some of the coarser CLS gauge field ensembles with a pion mass of roughly 280 MeV are presented. The current results focus on two particular sets of charmonium quantum numbers J^{PC} : For $J^{PC} = 1^{--}$ the $\Psi(3770)$ resonance is considered as a benchmark for our methods, while we attempt to predict the more interesting resonance spectrum with $J^{PC} = 0^{++}$. For $J^{PC} = 0^{++}$ Belle sees a candidate for the χ'_{c0} and the $X(3915)$ seen in the $J/\psi\pi\omega$ channel has previously been argued to have these quantum numbers. The future aim of our investigation is to further extend the scope of these calculations with the long-term goal of understanding the properties of the $X(Y,Z)$ states that do not fit into the conventional models of quark-antiquark mesons.

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