Contribution ID: **8** Type: **Invited talk**

Scalar and Tensor charmonium resonances from lattice QCD

Tuesday, 2 July 2024 11:50 (30 minutes)

I will discuss scalar and tensor charmonium resonances determined using lattice QCD. Working at $m_\pi \approx 391$ MeV, more than 200 finite-volume energy levels are computed and these are used in extensions of the Lüscher formalism to determine infinite volume scattering amplitudes. Working in the approximation where charm-annihilation is forbidden, the ground state $\chi_{c0}(1P)$ and $\chi_{c2}(1P)$ states are stable. Below 4000 MeV we find a single χ_{c0} and a single χ_{c2} resonance, both strongly-coupled to several decay channels consisting of pairs of open-charm mesons. Both resonances are found on the closest unphysical sheet just below 4000 MeV with widths of $\approx$ 60 MeV. The largest couplings are to the closed $D^*\bar{D}^*$ channels in S-wave, but several open-charm channels are also found to be large and significant in both cases. All closed-charm channels are found to be approximately decoupled. No additional states are found beyond what would be expected from quark-model-like $c\bar{c}$ excitations.

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