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Exotic Tccus tetraquark from numerical simulations of QCD

The recent discovery of the exotic Tcc tetraquark by the LHCb collaboration has garnered significant interest in the particle physics community. Building on this discovery, our research investigates the potential existence of another exotic tetraquark, Tccus, which could be within the reach of LHCb, if it exists. Using lattice QCD, a first-principles approach, we simulate scattering of charm $D^{(*)}$ and charm-strange $D_s^{(*)}$ mesons. Finite volume energy spectra, determined using variational procedures, are utilized to extract the coupled channel $DD_s^* - D_s D^*$ scattering amplitudes. Pole singularities in the resultant amplitudes across the complex energy plane are extracted and studied in conjunction with the known hadronic features in the experimental cross sections and/or with potentially yet-to-be-discovered tetraquark candidates.

Field of contribution

Theory

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