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Parameters of a potential model for tetraquarks from S- and P-wave charmonium mesons

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The masses of low-lying S-wave and P-wave charmonium mesons are evaluated in a constituent quark model (CQM) where the Cornell-like potential and Breit-Fermi interaction are employed. All model parameters are imported from the previous work of S-wave meson mass calculation. Two sets of complete bases are constructed by using the harmonic oscillator wave function, and the Sturmian wave function, respectively. In the calculations, the bases size is $N = 38$, and the length parameters of the complete bases are adjusted to determine the eigenvalues. The thus established model with one set of parameters may be applied to study higher excited meson states as well as tetraquark systems.

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