Study of tetraqurk spectroscopy in group theory and quark model

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In the past several years, a charged charmoniumlike Z_c^+ family, $Z_c^+(4430)$, $Z^+(4051)$, $Z^+(4248)$, $Z_c^+(4200)$, $Z_c^+(4240)$,

Permutation groups are applied to analyze the symmetries of multi-quark systems and, as examples, wave functions of meson and tetraquark states are constructed systematically in the language of Yamanouchi basis. Spatial wave function of tetraquark are evaluated in the Cornell potential. The explicit form of the spatial wave functions are derived from non-relativistic Schrodinger equation.

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