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Analysis of the pentaquark mass and decay width in a constituent quark model HIDEKI MATSUMURA, Graduate School of Science and Technology, Niigata University, YASUYUKI SUZUKI, Department of Physics, Niigata University — After the discovery of the pentaquark Θ^+ by the LEPS collaboration at Spring-8 in Japan, its existence was further investigated by other experimental groups. Though the mass and width for KN decay reported by several experimental groups are consistent each other to some extent, its spin and parity are not yet determined. Several models have been proposed to predict the spin and parity of Θ^+ . There are two representative studies on the pentaquark in a constituent quark model. First one is the Jaffe-Wilczek model $(ud - ud - \bar{s})$, the other one is the Karliner-Lipkin model $(ud - ud\bar{s})$. As these models are restricted to a special degree of freedom of spin, isospin, and color, they may be insufficient to describe the pentaquark more accurately. For the purpose, we use explicitly correlated basis functions as the orbital wave function, and take into account all possible spin, isospin, and color channels, then present a precise 5-body calculation for Θ^+ , By using a real stabilization method, we identify a Θ^+ resonance in the continuum. In this way, we analyze the pentaquark mass and NK decay width for spin and parity states.

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