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QCD sum rule for spin-3/2 pentaquarks JUN SUGIYAMA, Tokyo Insitute of Technology, TAKUMI DOI, RIKEN BNL Research Center, MAKOTO OKA, Tokyo Institute of Technology — Most QCD-based-approaches, i.e, sum rules and lattice simulations, for pentaquark baryons have been done under the assumption that the pentaquarks have spin-1/2. But, the quark model calculations indicate possibility of spin- 3/2. Because the Θ^+ with $J^\pi = 3/2^-$ decays into D- wave NK states, this scenario may explain the narrow decay width of Θ^+. Thus, we study the spin-3/2 pentaquarks using QCD sum rule technique. The spin-3/2 field is treated as a Rarita-Schwinger field. We consider two kinds of the diquark-type interpolating field operators and analyze which one is preferable. We perform parity projection and explore the existence of the pentaquark with $J^\pi = 3/2^+$ and $J^\pi = 3/2^-$. We find that Θ^+ both of $3/2^+$ and $3/2^-$ are possible to exist, the $3/2^-$ state comes lower in energy than $3/2^+$ by about 60MeV and their masses are around 1.5GeV, but they depend on the threshold parameters. We will report the results of the other pentaquark baryon.

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