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HAL QCD method and Nucleon-Omega interaction with physical quark masses

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After introducing the fundamental difficulties of the two-baryon systems in lattice QCD, we review the severe problems in the previous studies by the direct method and reliabilities of the HAL QCD method.
From the HAL QCD method, we study Nucleon-Omega interaction at almost physical quark masses. A strong attractive potential without a repulsive core is found in $^5S_2$ channel, and we discuss the possibility of the dibaryon formation.

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