



Contribution ID: 14

Type: **1st and 2nd weeks (Hadron structure and interactions)**

Examination of the $\phi - NN$ bound-state problem with HAL QCD $N - \phi$ potentials

Thursday, October 17, 2024 3:00 PM (30 minutes)

The lattice QCD analysis of the HAL QCD Collaboration has recently derived spin $3/2$ $N - \phi$ potential based on the $(2 + 1)$ -flavor lattice QCD simulations near the physical point $m_\pi \simeq 146.4$ MeV and $m_K \simeq 525$ MeV on a large lattice space- time volume $\simeq (8.1 \text{ fm})^4$.

We looked closely at phi-meson (ϕ) and two nucleons (NN) system making use of the HAL QCD Collaboration $N - \phi$ interactions and the realistic NN Malfliet-Tjon (MT) potential.

The developed Faddeev three-body calculations for $(I)J^\pi = (0)2^- \phi-d$ system in maximum spin lead to ground state binding energy of about 7 MeV and a matter radius of about 8 fm. Our results indicate the possibility of the formation of new nuclear clusters.

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Session Classification: 1-day Workshop (1st week)