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The bound-state of a phi-meson (□) and three nucleons (NNN)

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The four-body Schrödinger equations in momentum representation are solved to investigate the bound-state solutions for a system consisting of a phi-meson (ϕ) and three nucleons (NNN). The analysis uses a new spin-3/2 N–ϕ potential derived from lattice QCD simulations near the physical point and the realistic NN Malfliet-Tjon (MT) potential. Our numerical calculations for the ϕppn system in maximum spin result in a ground state binding energy of approximately 12 MeV. These findings indicate the potential for the formation of novel nuclear clusters.

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