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Nuclear states and spectra in holographic QCD

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A new method to study nuclear physics via holographic QCD is proposed. Multiple baryons in the Sakai-Sugimoto background are described by a matrix model which is a low energy effective theory of D-branes of the baryon vertices. We study the quantum mechanics of the matrix model and calculate the eigenstates of the Hamiltonian. The obtained states are found to coincide with known nuclear and baryonic states, and have appropriate statistics and charges. Calculated spectra of the baryon/nucleus for small baryon numbers show good agreement with experimental data. The model partially explains even the magic numbers of light nuclei, N=2, 8 and 20.

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