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Charmonium-nucleon interactions from 2+1 flavor lattice QCD

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In this talk we report on the lattice QCD calculations of the interactions between a charmonium (either η_c and J/ψ) and a nucleon. We use the method introduced by the HAL QCD collaboration to compute potentials, which guarantees the interaction to be faithful to the QCD S-matrix below the open-charm threshold. Our lattice simulation is performed with $2+1$ flavor full QCD gauge configurations on a $32^3 \times 64$ lattice generated by the CP-PACS and JLQCD collaborations. The relativistic heavy quark action is employed for charm quarks. We find that both $\eta_c N$ and $J/\psi N$ are weakly attractive, but not strong enough to have a bound state.

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