Contribution ID: **91**   Type: **Contributed**

Extracting the hadron-hadron interaction from the Nambu-Bethe-Salpeter wave functions: separable representation

Friday, 9 June 2023 09:25 (20 minutes)

In this talk, I will introduce an alternative method of derivative expansion to extract the hadron-hadron potential from Nambu-Bethe-Salpeter (NBS) wave functions that is more efficient in handling large nonlocality. While the HALQCD method has become popular for obtaining hadron interactions from lattice QCD simulations, its derivative expansion has been criticized for its unclear systemic uncertainties. In this talk, I will use an example to demonstrate that general potentials cannot be accurately fixed by a small number of NBS wave functions. Additionally, we propose using the Ernst-Shakin-Thaler (EST) method to extract the hadron-hadron interaction from NBS wave functions. I will showcase its effectiveness using a realistic nucleon force, which is more efficient than the derivative expansion in handling very nonlocal interactions and also provides a way to estimate the systemic uncertainties of the derivative expansion.

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Session Classification: Hadron decays, production and interaction

Track Classification: Hadron decays, production and interactions