Contribution ID: **110** Type: **Talk**

Baryon interactions in lattice QCD: the direct method vs. the HAL QCD potential method

Thursday 28 July 2016 16:30 (20 minutes)

In lattice QCD, both direct method for eigen-energy extraction and HAL QCD method for potential are employed so far to study hadron interactions. The scattering phase shifts, for example, are obtained through the Luscher's finite volume formula for the former,
but they are calculated via the Schroedinger equation with the potential in the infinite volume for the latter.
Although both methods should agree in principle, some systematically different conclusions are reported for existences of bound states in the previous studies: while the potential shows no sign of the bound state in two nucleon systems at heavier pion masses, for example, the eigen-energy indicates its existence.

In this work, we clarify that these discrepancies come from a failure of the eigen-energy extraction for the ground state due to the contamination of excited states in time correlation functions, while the HAL QCD potential method is free from this problem.
We finally establish consistencies between two lattice QCD approaches, and propose an improved extraction of eigen-energy for the time correlation functions using energy eigen-functions obtained from the HAL QCD potential.

Author: Dr IRITANI, Takumi (Stony Brook University)

Presenter: Dr IRITANI, Takumi (Stony Brook University)

Session Classification: Hadron Spectroscopy and Interactions

Track Classification: Hadron Spectroscopy and Interactions