Contribution ID: **80**   Type: **Oral presentation**

HAL QCD potentials with non-zero total momentum and an application to the $I = 2\,\pi\pi$ scattering

Thursday, 29 July 2021 22:30 (15 minutes)

We propose a method to extract the HAL QCD potential from correlation functions with non-zero momentum (boosted system). After brief explanation of the formulation with non-zero total momentum (P), we apply it to the $I = 2\,\pi\pi$ system. Using 2+1 flavor PACS-CS configurations at $m_\pi = 700$ MeV and $a = 0.09$ fm on $32^3 x64$ lattice, we calculate the $I = 2\,\pi\pi$ potential with $P = 2\pi/L$ and $4\pi/L$ as well as $P = 0$ (center of mass frame). We show that potentials from all 3 cases agree well within statistical errors, which are however larger for larger P.

Not only scattering phase shifts obtained from these potentials agree well but they also agree with scattering phase shifts obtained from finite volume energy spectra through L\"uscher's formula.

This shows that the HAL QCD potential method works well even with non-zero total momentum.

We briefly discuss future applications of the method to hadron interactions.

Primary authors: AOKI, Sinya (Kyoto University);   AKAHOSHI, Yutaro (Yukawa Institute for Theoretical Physics, Kyoto University)

Presenter: AOKI, Sinya (Kyoto University)

Session Classification: Hadron Spectroscopy and Interactions

Track Classification: Hadron Spectroscopy and Interactions