



Contribution ID: 136

Type: Talk

Omega-Omega interaction from 2+1 flavor QCD

Thursday, 26 June 2014 15:35 (20 minutes)

We report our results of central potential between two Omega baryons from 2+1 flavor full Lattice QCD simulation. In the past studies, there is a possibility that some decuplet baryons have a bound state.

However, almost all decuplet baryons are unstable due to decays via the strong interaction.

An exception is the Omega decuplet baryon, which is stable against the strong decays, so its interaction is suitable to be investigated.

It is, however, still difficult to investigate the Omega-Omega interaction experimentally due to its short-life time via weak decays. Therefore, the lattice QCD study for the Omega-Omega interaction is necessary and important.

We present results obtained by the extension of the HAL QCD method to the system of two decuplet baryons.

Our numerical results are obtained from 2+1 flavor full QCD gauge configurations at

$L \sim 2.9\text{fm}$, $m_\pi \sim 701\text{MeV}$ and $m_\Omega \sim 1966\text{MeV}$, generated by the PACS-CS Collaboration.

We find that the Omega-Omega interaction is strong attractive, but it's not strong enough to make a bound state at our simulation set up.

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Session Classification: Hadron spectroscopy and interaction

Track Classification: Hadron Spectroscopy and Interactions