Contribution ID: **63** Type: **Contributed talk**

Correlation functions for the Ds(2317) and N*(1535)

Thursday 11 July 2024 17:15 (20 minutes)

We face the inverse problem of obtaining the interaction between coupled channels from the correlation functions of the the 0+, +0, and ++ channels,from where the *0(2317) state emerges. We use synthetic data extracted from an interaction model based on the local hidden gauge approach and find that the inverse problem can determine the existence of a bound state of the system with a precision of about 20 MeV. At the same time, we can determine the isospin nature of the bound state and its compositeness in terms of the channels. Furthermore, we evaluate the scattering length and
effective range of all three channels, as well as the couplings of the bound state found to all the components. Lastly, the size parameter of the source function, can be obtained from a fit to the data with relatively high accuracy. These findings show the value of the correlation function to learn about the meson–meson interaction for systems which are difficult
to access in other present facilities.

We apply the same method to the coupled
channels K0Σ+, K+Σ0, K+Λ and ηp which generated dynamically the N*(1535) state. We find that, assuming errors of the same order
than in present measurements of correlation functions, one can determine the scattering length and effective range of all channels with a very good accuracy. Most remarkable is the fact that the method predicts the existence of a bound state of isospin 1/2 nature around the mass of the N*(1535) with an accuracy of 6 MeV.
The contribution is based on the papers
Phys.Rev.D 109 (2024) 054002 and Phys.Lett.B 847 (2023) 138281

session

C. Hadron Structure

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Session Classification: C. Hadron Structure