

RCNP, OSAKA UNIVERSITY

NUCLEAR PHYSICS

THEORY SEMINAR

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| Title | MODEL-INDEPENDENT DETERMINATION OF STRUCTURE OF EXOTIC HADRONS WITH THE SCATTERING AMPLITUDE |
| Speaker | Yuki KAMIYA (Kyoto University) |
| Date and Time | July 23th (Mon) in 2018 13:30 |
| Place | Lecture room 1 on the 6th floor of RCNP main building |

Abstract :

Understanding of the internal structure of exotic hadrons is an important topic of the current hadron physics. Particularly in recent years, precise data on the hadron scattering have been accumulated from the experimental analysis, and it is becoming possible to extract detailed information on the scattering amplitude. This enables us to study the hadron structure from the properties of the scattering amplitude.

In this seminar, the model-independent approaches to study the hadron structure from the scattering amplitude are discussed. In the first part, the weak-binding relation between the experimental observables and compositeness, defined as the probability of finding the composite component, is introduced [1, 2]. While the compositeness is in general model-dependent quantity, this can be calculated in a model-independent manner using the experimental observables when the hadron is weakly-binding s-wave state. Here, I mainly explain the reasoning of small model dependence of the compositeness in the weak-binding limit.

In the second part, we see the qualitative method using the position of the Castillejo - Dalitz-Dyson (CDD) zero defined as the zero of the amplitude [3].

For the eigenstate that originates in the hidden channel, the existence of the CDD zero close to the pole is indicated by the topological nature of the phase of the amplitude. At the end of each part, the applications to $\Lambda(1405)$ baryon are discussed.

[1] S. Weinberg, Phys. Rev. 137, B672 (1965).

[2] Y. Kamiya and T. Hyodo, Phys. Rev. C 93, 035203 (2016), Y. Kamiya and T. Hyodo, Prog. Theor. Exp. Phys. (2017) 023D02.

[3] Y. Kamiya and T. Hyodo, Phys. Rev. D 97, 054019 (2018).

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