
Contribution ID: **29** Type: **not specified**

# Internal structure of near-threshold states using compositeness

*Tuesday 19 August 2025 13:00 (25 minutes)*

Motivated by recent observations of exotic hadrons in the near-threshold energy region, the internal structure of near-threshold states has been intensively studied. To investigate their structure, we focus on a qualitative measure, called the compositeness $X$, defined as the probability of finding the clustering component in the wavefunction [1]. It is shown that in the limit where the eigenenergy goes to zero ($E \to 0$), the compositeness becomes unity as a consequence of the low-energy universality [2]. This indicates that the states exactly at the threshold commonly have a purely cluster structure, independently of the details of the system.

In this talk, we discuss the internal structure of near-threshold eigenstates that emerge slightly away from the $E \to 0$ limit, where $X = 1$ as a consequence of the low-energy universality. Using the compositeness, we show that shallow bound states below the threshold are typically composite dominant [3] and resonance above the threshold exhibit a different structure [4]. We further extend the analysis to near-threshold states in systems governed by both short-range and Coulomb interactions, where the low-energy universality does not hold due to the long-range interaction. However, we find that the remnants of the universality can appear depending on the competition between the interactions. We also address the internal structure of p-wave bound states near the threshold, by comparing to s-wave cases.

[1] T. Kinugawa, T. Hyodo, Eur. Phys. J. A 61, no.7, 154 (2025).
[2] T. Hyodo, Phys. Rev. C 90, 055208 (2014).
[3] T. Kinugawa and T. Hyodo, Phys. Rev. C 109, 045205 (2024).
[4] T. Kinugawa and T. Hyodo, arXiv:2403.12635 [hep-ph].

**Author:** KINUGAWA, Tomona (RIKEN)

**Presenter:** KINUGAWA, Tomona (RIKEN)

**Session Classification:** Researcher session