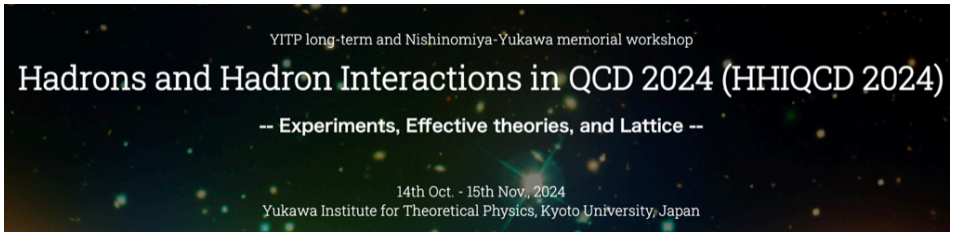

Contribution ID: **66** Type: **1st and 2nd weeks (Hadron structure and interactions)**

The three-body DD^*K system on the lattice

Thursday, October 17, 2024 2:00 PM (30 minutes)

We firstly employ the novel lattice EFT method to multi-hadron systems. The DD^*K three-body system is taken as an illustration to demonstrate the great power of lattice EFT to hadron physics, especially the potential application for many-body systems. The sub two-body interactions are fixed by the T_{cc}^+, $D_{s0}^*(2317)$ and $D_{s1}(2460)$ states.
When the three-body interaction is repulsive (even for the infinite repulsive interaction), the three-body energy is no larger than the $D_{s1}(2460)D$ threshold, making the three-body state existing unambiguously. To check the renormalization group invariance of our framework, we extract the first excited state. We find that when the ground state is fixed, the first excited states with various cutoffs coincide with each other when the cubic size goes larger. In addition, the standard angular momentum and parity projection technique is implemented for the quantum numbers of the ground and excited states. We find that both of them are S-wave state with quantum number $J^P = 1^-$. Because the three-body state contains two charm quarks, it is more easier to be detected in the Large Hadron Collider.

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