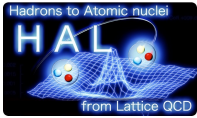
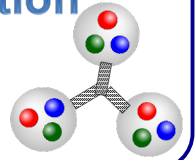


# New configuration set of the HAL QCD collaboration

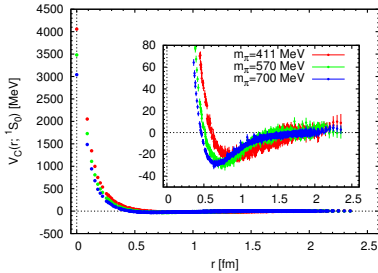


Etsuko Ito (YITP, Kyoto U./ iTHEMS, RIKEN/ JST PRESTO)  
for HAL QCD Collaboration



## Motivations

Hadron interactions sometimes are very sensitive to pion (quark) masses  
In particular: Dibaryons, Hypernucleus, Tcc...



Interaction potential depends on the pion mass

➤ Computer upgrade and our configurations

K computer (2012-2019)



Fugaku computer (2021-)



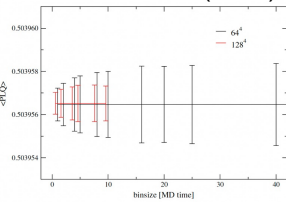
$m_\pi \approx 146\text{MeV}$   
 $m_K \approx 525\text{MeV}$

This poster presentation!!

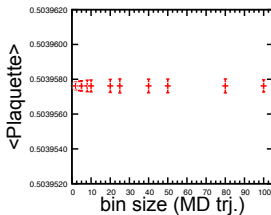
## Basic Properties

➤ Plaquette value

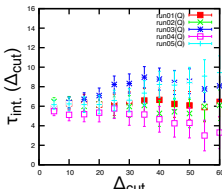
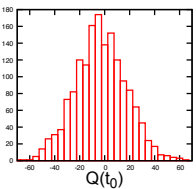
PACS coll.(2019)



Our new data

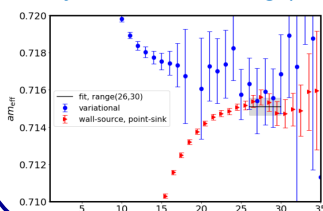


➤ Topological charge and integrated auto-correlation



$\tau_{int.} \lesssim 12[\text{MDtrj.}]$   
very short

➤ Physical scale setting ( $\Omega$  baryon mass)



Input: 1672[MeV](PDG)

$a^{-1} = 2338.8[\text{MeV}]$   
 $a = 0.084372[\text{fm}]$

## Simulation setup

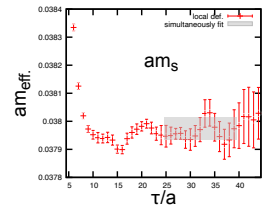
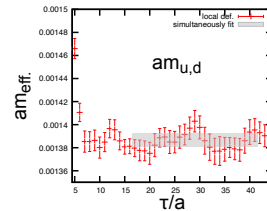
- Lattice action: Iwasaki gauge  
Nf=2+1 Improved Wilson fermion
- Lattice size:  $96^4$
- Lattice parameter:  
 $\beta = 1.82, \kappa_{ud} = 0.126117, \kappa_s = 0.124902$   
(same with PACS-10 collaboration,  $64^4$  and  $128^4$ )
- # of configurations: 1,600 conf. (8,000 MD trj.)

## Calculation strategy

- Meson masses  
PS mesons : PS-PS and PS-A4 simultaneous fit (central analysis)  
Local effective mass calc.  
Vector mesons: Local effective mass calc.
- Baryon masses  
Wall source (central analysis) + Variational method

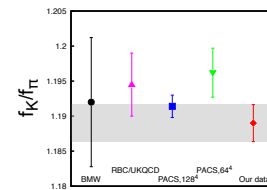
## Summary

➤ PCAC masses

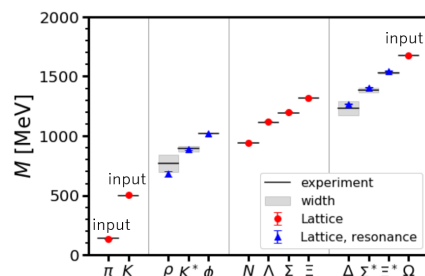


$m_s/m_{u,d} = 27.39(11)$ , FLAG(2021):27.42(12)

➤ Ratio of decay constants



➤ Hadron masses



Preliminary results of hadron force given by T.M.Doi's talk  
Hadronic and Nuclear Spectrum and Interactions  
PM5:00, Aug. 3 (Thu)