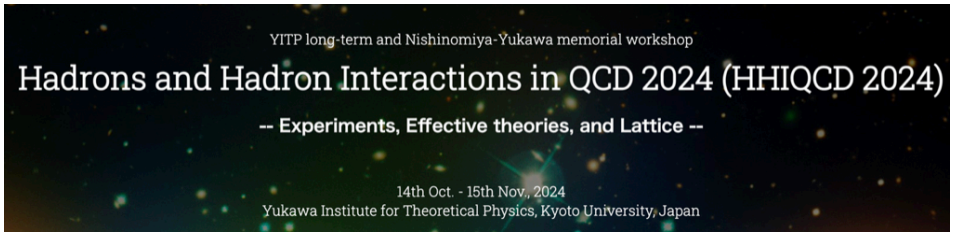

Contribution ID: **77** Type: **5th week (Formal developments and other frontiers in lattice QCD)**

Computing mass spectra of gauge theories in the Hamiltonian formalism

Wednesday, November 13, 2024 3:30 PM (1 hour)

We present a couple of methods to compute the mass spectra of composite particles (hadrons) in gauge theories,
which can be implemented in quantum computing or tensor networks in the Hamiltonian formalism.
The hadron mass can be efficiently computed from the one-point function, combining the correlation function to deal with the operator mixing.
Alternatively, we can obtain the dispersion relation directly by measuring the energy and momentum of the excited states,
where the isospin quantum numbers are used to distinguish the type of hadrons.
We demonstrated these methods in the 2-flavor Schwingr model using the density-matrix renormalization group
and obtained precise results even in the large θ region where the Monte Carlo simulation fails due to the sign problem.
Then the pion and the sigma meson are identified as stable particles of the model, whereas the eta meson becomes unstable at nonzero θ.
The meson masses computed by the distinct methods agree with each other and are also consistent with the calculation by the bosonized model.

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Session Classification: Seminar (5th week)