Contribution ID: **33** Type: **not specified**

Numerical exploration of a mass-split model with four light and eight heavy flavors

Wednesday, 14 March 2018 11:30 (30 minutes)

Using the specific example of four light and eight heavy flavors we explore mass-split models using fully dynamical numerical simulations. We present results for the meson spectrum showing states made up of only light or only heavy flavors in order to verify theoretical expectations. With results obtained at two values of the bare gauge coupling, five different values for the mass of heavy flavors, and up to six different light quark masses, we demonstrate hyperscaling and the irrelevance of the gauge coupling. We find that the heavy-heavy spectrum is qualitatively different from QCD, e.g. the mass of the heavy-heavy quarkonia is no longer proportional to the constituent quark mass.

We close by presenting an outlook on ongoing work with four light and six heavy flavors. The aim of this work is to confirm our previous findings and explore a system expected to have a larger anomalous dimension critical for phenomenological applications.

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Session Classification: BSM and QCD