Contribution ID: **44** Type: **not specified**

Low-lying charmonium properties from lattice QCD + quenched QED

Thursday, 6 August 2020 17:00 (20 minutes)

The properties of low-lying charmonium mesons offer points of high precision comparison between lattice QCD and experiment, if discretisation effects set by the charm quark mass can be controlled. Using $n_f = 2 + 1 + 1$ configurations with the HISQ action, developed by the HPQCD collaboration to have very small discretisation errors, we achieve precision at or below the 1% level for a range of quantities. These include the hyperfine splitting, the J/ψ vector (and tensor) decay constants and the charm connected hadronic vacuum polarisation contribution to the anomalous magnetic moment of the muon. For the last of these we are able to obtain a result with a 0.3% uncertainty. At this level of precision it is necessary to understand leading electromagnetic effects which we do through the inclusion of quenched QED. One such effect that must be accounted for is the electromagnetic effect on the tuning of the charm mass in our calculations. The meson mass shift from QED may be separated into contributions from the quark self energy and the physical contribution from the Coulomb potential. We extract the Coulomb potential contribution and compare with expectations from potential models.

Primary author: HATTON (*), Daniel (University of Glasgow)

Co-authors: HPQCD COLLABORATION; DAVIES, Christine; KOPONEN, Jonna; LEPAGE, G. Peter; LYTLE, Andrew

Presenter: HATTON (*), Daniel (University of Glasgow)

Session Classification: Hadron Spectroscopy and Interactions

Track Classification: Hadron Spectroscopy and Interactions