Contribution ID: **201** Type: **Talk**

Precise decay rate for $\eta_b \to \gamma\gamma$ with Highly Improved Staggered Quarks

Thursday, 1 August 2024 10:40 (20 minutes)

We calculate the decay rate for the η_b meson to two photons for the first time in lattice QCD, building on our previous accurate calculation of the rate for $\eta_c \to \gamma\gamma$. Using the Highly Improved Staggered Quark formalism for valence and sea quarks, we work at lattice spacings from 0.12 fm down to 0.03 fm. Gluon configurations with the effect of u, d, s and c quarks in the sea were provided by the MILC Collaboration. Extracting a form factor, $F(0,0)$, for two on-shell photons over a range of heavy quark masses m_h between that of the b and c quarks, we can accurately determine the value of the ratio $f_{\eta_h}/(F_{\eta_h}(0,0)M_{\eta_h}^2)$, with f_{η_h} and M_{η_h} the pseudoscalar meson decay constant and mass. This can be compared to the approximate value of 0.5 from leading order nonrelativistic QCD. We determine the decay rate $\Gamma(\eta_b \to \gamma\gamma)$ at the b quark mass, providing a precise prediction for searches by the Belle II Collaboration.

Primary authors: COLQUHOUN, Brian (University of Glasgow); DAVIES, Christine (University of Glasgow); LEPAGE, G. Peter

Presenter: COLQUHOUN, Brian (University of Glasgow)

Session Classification: Hadronic and nuclear spectrum and interactions

Track Classification: Hadronic and Nuclear Spectrum and Interactions