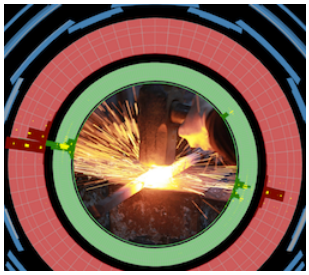

Contribution ID: **131** Type: **parallel talk**

Hadron Resonances from Lattice QCD

Tuesday 10 May 2016 14:30 (15 minutes)

Our group studied the low-lying hadron spectrum of lattice QCD on a large $32^3 \times 256$ anisotropic space-time lattice at a near-physical pion mass of 240 MeV. Quark fields were smeared using a Laplacian Heaviside kernel which is later exploited to estimate quark propagation with a novel method: the Dirac matrix-inverse is stochastically estimated by introducing noise vectors in the Laplacian Heaviside subspace. Interpolating operators expected to overlap with single- and two-particle meson and baryon states were used, staying below the three-particle energy threshold. Preliminary results for the $I = 1, S = 0, T_{1u}^+$ channel will be shown, along with other channels. The Luescher method has been applied to the two-particle finite-volume spectrum to obtain results for the phase shift and width of the ρ. Future work will briefly be discussed, which includes an alternative to the Luescher method involving an effective finite-volume Hamiltonian to fit the spectrum, and the implementation of tetraquark operators with fundamental (and higher) gauge-links.

Summary

This talk will be showing methods used by our group for studying hadron resonances with lattice QCD. Our preliminary results with a $32^3 \times 256$ anisotropic lattice will be shown, which includes the finite-volume spectrum in multiple channels and the ρ scattering phase shift. Additionally, I will discuss future plans for alternatives to the Luescher method and for implementing tetraquarks.

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Session Classification: QCD & Electroweak