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Radial and orbital excitation energies of charmonium

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The system of charmonium has several excited states below the energy threshold for decay into D and Dbar mesons, which can in principle be studied accurately in lattice QCD. Studies that include many states in the spectrum have typically only been done at one value of the lattice spacing and with light quarks in the sea. Here we give results for radial and orbital excitation energies for charmonium from a calculation on 2+1+1 MILC configurations at multiple lattice spacings and including physical values for u/d quark masses. We use the HISQ formulation for c for small discretisation errors and smeared operators to improve excited state overlap.

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