Investigation of the overlap of excited bottomonium states with hybrid operators

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Abstract: We analyze the overlap of color-octet meson operators with the Υ and η_b and their excited states, especially the first radial excitation. Our runs are based on the framework of NRQCD, including all terms up to order v^4. We use a variety of source and sink operators as a basis for the variational method, which enables us to clearly separate the mass eigenstates and hence to extract the desired amplitudes. We performe our simulations on configurations of the MILC collaboration, both quenched and dynamical. The results show that the first radial excitations of the Υ and the η_b have non-vanishing overlap with the corresponding local hybrid operators, seemingly contrary to recent results for charmonium. These results also demonstrate the usefulness of the variational method for determining couplings to excited hadronic states.