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Flavor mixing in charmonium and light mesons with optimal distillation profiles

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We study the light meson - charmonium - glueball mixing using flavor-singlet meson operators built from optimal distillation profiles together with purely gluonic operators in different J^{PC} channels at two different pion masses ($m_\pi \approx 420, 800$ MeV) in two $N_f = 3 + 1$ ensembles at almost physical charm quark mass. We observe non-zero mixing correlations between the different types of operators and quantify the overlaps between states created by them and the energy eigenstates by means of a GEVP formulation. We are particularly interested in the scalar glueball and its possible decay into two pions so we also include two-pion operators in our calculation.

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