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Individual eigenvalue distributions for chGSE-chGUE crossover and determination of low-energy constants in two-color QCD+QED

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We evaluate the individual distributions of four smallest eigenvalues from chiral random matrix ensembles interpolating chGSE and chGUE by the quadrature method applied to the Fredholm Pfaffian of dynamical Bessel kernel containing a crossover parameter. These distributions are then fitted with the staggered Dirac spectra of the quenched SU(2) lattice gauge theory in the presence of fluctuating or constant U(1) fields. Combination of the four best-fitting crossover parameters from matching each random matrix theory prediction to the corresponding histogram of the k-th Dirac eigenvalue allows for an efficient and precise determination of low-energy constants F and \Sigma in the chiral Lagrangian of Nambu-Goldstone bosons on the coset space SU(2n)/Sp(2n) from relatively small lattices.

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