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New look at the spectrum of low-lying mesons

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The spectrum of mesons with mass less-than 2 GeV, especially those with strangeness, is poorly understood - both experimentally and theoretically. We address this issue by employing a novel method for constructing a kernel for the meson bound-state problem. The scheme produces a closed-form kernel that is symmetry-consistent (discrete and continuous) with the gap equation defined by any admissible gluon-quark vertex. Applicable even when the diagrammatic content of that vertex is unknown, the scheme can foster new synergies between continuum and lattice approaches to strong interactions. The framework is illustrated by showing that the presence of a dressed-quark anomalous magnetic moment in the gluon-quark vertex, an emergent feature of strong interactions, can remedy many defects of widely used meson bound-state kernels, including the mass splittings between vector and axial-vector mesons and the level ordering of pseudoscalar and vector meson radial excitations. The new insights may be exploited by the spectroscopy programme in the AMBER project at CERN.

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