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New results on the use of the operator product expansion in finite-energy sum rules for light-quark correlators

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Tau-based finite-energy sum rule (FESR) analyses often assume that scales s_0~m_tau^2 are large enough that (i) integrated duality violations (DVs) can be neglected, and (ii) contributions from non-perturbative OPE condensates of dimension D scale as ~(Lambda_{QCD}/m_tau)^D, allowing the OPE series to be truncated at low dimension. The latter assumption is not true in general since the OPE series is not convergent, while the former is open to question given experimental results for the electromagnetic, I=1 vector (V), I=1 axial vector (A) and I=1 V+A current spectral functions, which show clear DV oscillations with amplitudes comparable in size to the corresponding alpha_s-dependent perturbative contributions at hadronic invariant mass-squareds s~2-3 GeV^2. In this talk, we (1) introduce, and illustrate the utility of, a new strategy for assessing the numerical relevance of omitted higher-D OPE and/or residual DV contributions, (2) use large N_c and analyticity arguments to derive the expected large-s form for DV contribution to the I=1, V spectral function, under the assumption that the leading behavior is Regge-like at large s, and (3) use this form to explore the level of suppression of residual integrated DV contributions in I=1, V channel FESRs.

What is your topic?

Hadronic decays

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