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Wilson coefficients of Four-Quark Condensates for the Description of Medium Modifications of qQ Mesons

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Medium dependent spectral properties of qQ mesons are evaluated by means of QCD sum rules at non-zero nucleon densities and/or temperatures. The well-known operator product expansion (OPE) of qQ mesons in medium up to mass dimension 5 is extended to four-quark condensate contributions of mass dimension 6. A complete catalogue of four-quark condensates in the qQ sector is presented. The calculation of associated Wilson coefficients from tree-level diagrams is performed for pseudo-scalar interpolating currents. Condensates containing field operators of heavy quarks are expanded in powers of the inverse heavy quark mass. Adding four-quark condensate contributions of heavy quarks to the medium OPE goes beyond latest D meson sum rule evaluations. First numerical results showing the impact of four-quark condensate contributions are presented. Since the medium dependence of four-quark condensates is expected to influence the in-medium properties of mesons, accessible at the envisaged experiments at FAIR, the determination of the four-quark condensate contributions is crucial.

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