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semileptonic decay of charm meson in the relativistic quark model

The form factors parameterizing the weak D and Ds transitions to light pseudoscalar and vector mesons are calculated in the framework of the relativistic quark model based on the quasipotential approach. The special attention is paid to the systematic account of the relativistic effects including transformation of the meson wave function from the rest to moving reference frame and contributions of the intermediate negative-energy states. The form factors are expressed through the overlap integrals of the meson wave functions, which are taken from previous studies of meson spectroscopy. They are calculated in the whole range of the transferred momentum q^2. Convenient parameterization of the form factors which accurately reproduces numerical results is given. The obtained values of the form factors and their ratios at $q^2 = 0$ agree well with the ones extracted form the experimental data. On the basis of these form factors and helicity formalism, differential and total semileptonic decay rates of D and Ds mesons as well as different asymmetries and polarization parameters are calculated. The detailed comparison of the obtained results with other theoretical calculations and experimental data is given.

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