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Semileptonic decays of charm mesons into orbitally and radially excited strange and light mesons

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The form factors parameterizing weak D and Ds transitions to orbitally and radially excited light mesons are calculated in the framework of the relativistic quark model based on the quasipotential approach. Special attention is paid to the systematic account of the relativistic effects including transformation of the final meson wave function from rest to moving reference frame and contributions of intermediate negative-energy states. Form factors are expressed through the overlap integrals of the meson wave functions, which are taken from previous studies of meson spectroscopy. The form factors are calculated in the whole range of the transferred momentum q2. A convenient parameterization of form factors is given, which accurately reproduces numerical results. On the basis of these form factors and helicity formalism, differential and total semileptonic decay rates of D and Ds mesons to excited strange and light mesons as well as different asymmetries and polarization parameters are calculated. A detailed comparison of obtained results with other theoretical calculations and available experimental data is given.

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