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Pair double heavy diquarks production in high energy proton-proton collisions

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On the basis of perturbative QCD and relativistic quark model we calculate cross sections of pair double heavy diquarks production in proton-proton interaction. Both, nonrelativistic and relativistic results are obtained. Relativistic factors in the production amplitude connected with the relative motion of heavy quarks and the transformation law of the bound state wave function to the reference frame of the moving S-wave diquark bound states are taken into account. The gluon and quark propagators entering the production amplitude are expanded in the ratio of the relative quark momenta to the diquark masses up to the second order. Relativistic corrections to the quark-quark bound state wave functions in the rest frame are considered by means of the Breit-like potential. It turns out that the examined effects significantly decrease the nonrelativistic cross sections.

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