

Quark-pair production in strong non-Abelian field

We have investigated quark-pair production in the early stage of heavy ion collisions, especially the massive strange and charm quark-pair production. Our kinetic model is based on a Wigner function method for fermion-pair production in strong non-Abelian fields. To describe the overlap of two colliding heavy ions we have applied the time-dependent color field with a pulse-like shape. The calculations have been performed in an SU(2)-color model with finite current quark masses. For strange quark-pair production the obtained results are close to the Schwinger limit, as we expected. For charm quark the large inverse temporal width of the field pulse, instead of the large charm quark mass, determines the efficiency of the quark-pair production. Thus we do not observe the expected suppression of charm quark-pair production connecting to the usual Schwinger-formalism, but our calculation results in a relatively large charm quark yield. This effect appears in Abelian models as well, demonstrating that particle-pair production for fast varying non-Abelian gluon field strongly deviates from the Schwinger limit for very heavy quarks. We display our results on number densities for light, strange, charm quark-pairs, and different suppression factors as the function of characteristic time of acting chromo-electric field.

Primary author: Dr LEVAI, Peter (KFKI RMKI)

Co-author: Dr SKOKOV, Vladimir V (Bogoliubov Laboratory, JINR, Dubna)

Presenter: Dr LEVAI, Peter (KFKI RMKI)

Track Classification: Poster session