

## Nonphotonic electrons at RHIC within the $k_t$ -factorization approach

Recently the PHENIX and STAR collaborations at RHIC have measured transverse momentum distribution of so-called nonphotonic electrons.

They have measured the total charm and bottom production cross-section for p+p and Au+Au collisions at 200 GeV. The dominant contribution to the nonphotonic electrons/positrons comes from the semileptonic decays of charm and beauty mesons.

In the first step of our approach the single particle spectra of heavy quarks and antiquarks are obtained assuming gluon-gluon fusion and quark-antiquark annihilation in the  $k_t$ -factorization approach. To obtain the single particle spectra of mesons from those of quarks/antiquarks a standard hadronization procedure with Peterson and Braaten et al. fragmentation functions are applied.

We find the semileptonic decay functions by fitting to recent data of the CLEO and BABAR collaborations. We have calculated inclusive spectra of nonphotonic electrons/positrons for RHIC energy. We have concentrated on the dominant gluon-gluon fusion mechanism and used two recent unintegrated gluon distribution functions from the literature. Special emphasis was devoted to the Kwieciński unintegrated gluon (parton) distributions. In this formalism, using unintegrated quark and antiquark distributions, one can calculate in addition the quark-antiquark annihilation including transverse momenta of initial partons (quarks/antiquarks). In addition, we have used unintegrated gluon distributions constructed by Ivanov and Nikolaev to describe deep-inelastic data measured at HERA. We have compared results obtained in our approach with experimental data measured recently by the PHENIX

collaboration at RHIC. We get a reasonable description of the data at large transverse momenta of electrons/positrons. In the next step of our analysis, we have calculated the kinematic correlations between charged leptons from semileptonic decays as well as for the Drell-Yan process based on unintegrated parton distributions. This includes correlation in azimuthal angle between charged leptons and correlations in transverse momenta of the leptons.

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