

## Recent STAR results and future perspectives of $W^{-(+)}$ boson production in polarized $p - p$ collisions at RHIC

Bernd Surrow

Massachusetts Institute of Technology

*surrow@mit.edu*

The RHIC spin physics program has recently completed the first data taking period in 2009 of polarized p+p collisions at  $\sqrt{s} = 500$  GeV. This opens a new era in the study of the spin-flavor structure of the proton based on the production of  $W^{-(+)}$  bosons.  $W^{-(+)}$  bosons are produced in  $\bar{u} + d$  ( $\bar{d} + u$ ) collisions and can be detected through their leptonic decays,  $e^- + \bar{\nu}_e$  ( $e^+ + \nu_e$ ), where only the respective charged lepton is measured.

The discrimination of  $\bar{u} + d$  ( $\bar{d} + u$ ) quark combinations requires distinguishing between high  $p_T$   $e^{-(+)}$  through their opposite charge sign, which in turn requires precise tracking information. At mid rapidity, STAR will rely on the existing Time Projection Chamber. At forward rapidity, new tracking capabilities will be provided by the Forward GEM Tracker, consisting of six tripe-GEM detectors being under construction. The suppression of QCD background over W boson signal events by several orders of magnitude is accomplished by using the highly segmented STAR Electromagnetic Calorimeter, requiring an isolation criteria suppressing jet events, and vetoing di-jet events based on the measured away side energy.

Recent STAR results on the first measurement of  $W^-/W^+$  boson production in polarized  $p - p$  collisions will be shown along with a discussion of future perspectives involving the STAR Forward GEM Tracker.