

# Production of $J/\psi$ and $\psi(2S)$ in p+p collisions at $\sqrt{s} = 510$ GeV from the STAR experiment

Chan-Jui Feng (for the STAR collaboration)  
National Cheng Kung University

## Abstract

Measurements of the production cross sections of heavy quarkonia, namely  $J/\psi$  and  $\psi(2S)$ , in hadron-hadron collisions provide valuable information about yet unsolved questions of Quantum Chromodynamics. The Solenoid Tracker At RHIC (STAR) is a major high-energy nuclear physics experiment at the Relativistic Heavy Ion Collider. Its Muon Telescope Detector, which provides trigger and identification capability for muons, enables to study quarkonia in the  $\mu^+\mu^-$  decay channel which is less affected by bremsstrahlung energy losses in detector materials.

In this poster, we will present the measurements of the production cross sections of the  $J/\psi$  and  $\psi(2S)$  mesons, as well as the  $\psi(2S)$  to  $J/\psi$  yield ratio as a function of  $p_T$  via the  $\mu^+\mu^-$  decay channel in p+p collisions at  $\sqrt{s} = 510$  GeV from data recorded in 2017 by the STAR experiment. It is the first measurement of  $\psi(2S)$  as a function of  $p_T$  from STAR experiment. The results will be compared with various theoretical models including Next-to-Leading Order NRQCD, Improved Color Evaporation Model, and Color Glass Condensate effective theory with the NRQCD formalism.