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Production of the exotic 1^{--} hadrons $\phi(2170)$, X(4260)andY_b(10890)$ at the LHC and Tevatron via the Drell-Yan mechanism

Friday, July 6, 2012 5:30 PM (15 minutes)

We calculate the Drell-Yan production cross sections and differential distributions in the transverse momentum and rapidity of the $J^{PC} = 1^{--}$ exotic hadrons $\phi(2170)$, $X(4260)$ and $Y_b(10890)$ at the hadron colliders LHC and the Tevatron.
These hadrons are tetraquark (four-quark) candidates, with a hidden $s\bar{s}$, $c\bar{c}$ and $b\bar{b}$ quark pair, respectively. In deriving the distributions and cross sections, we include the order α_s QCD corrections, resum the large logarithms in the small transverse momentum region in the impact-parameter formalism, and use the state of the art parton distribution functions. Taking into account the data on the production and decays of these vector hadrons
from the e^+e^- experiments, we present the production rates for the processes
$pp(\bar{p}) \to \phi(2170)(\to \phi(1020)\pi^+\pi^- \to K^+K^-\pi^+\pi^-) + ...$,
$pp(\bar{p}) \to X(4260)(\to J/\psi\pi^+\pi^- \to \mu^+\mu^-\pi^+\pi^-) + ...$,
and $pp(\bar{p}) \to Y_b(10890)(\to (\Upsilon(1S), \Upsilon(2S), \Upsilon(3S))\pi^+\pi^- \to \mu^+\mu^-\pi^+\pi^-) + ...$ Their measurements at the hadron colliders will provide new experimental avenues to explore the underlying dynamics of these hadrons.

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