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J/Psi energy correlator measurement at RHIC-STAR

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Quantum Chromodynamics (QCD), the fundamental theory of the strong interaction, governs the behavior of quarks and gluons. Heavy quarks (charm and bottom) hold unique value in strong interaction research: their large masses ensure production is dominantly governed by perturbative QCD, while the formation mechanisms of heavy quarkonium states (e.g., J/ψ) inherently span QCD's perturbative and non-perturbative regimes, providing a unique window into their interplay. This presentation reports the latest heavy quarkonium results from the RHIC-STAR Collaboration, focusing on production characteristics in proton-proton collisions. Through measurements of the J/ψ-energy correlator, we probe the micro-dynamical mechanisms governing quarkonium formation within the non-perturbative QCD regime. Furthermore, we discuss implications for J/ψ spin physics in heavy-ion collisions and their potential role in studying quark-gluon plasma (QGP) properties.

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