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Rescattering effects on spin-interference for rho0 photoproduction in heavy-ion collisions

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Recent measurements by various experiments in ultra-peripheral collisions have observed spin-interference in ρ^0 photoproduction, marking a breakthrough in Fermi-scale quantum interference experiments. Building on this, STAR extended the measurement to hadronic heavy-ion collisions, where significant rescattering effects on ρ^0 mesons were expected. In this study, we investigate how these rescattering effects influence the measurement of spin-interference. By embedding ρ^0 mesons produced via photoproduction, modeled by the Vector Meson Dominance model, into the Ultrarelativistic Quantum Molecular Dynamics framework, we estimate the impact on the $\cos 2\phi$ and $\cos 24\phi$ modulations, where ϕ is the angle between ρ^0 and one of the daughters'($\pi^{\pm}$) transverse momentum. The results indicate a significant suppression of the $\cos 2\phi$ modulation, while the $\cos 4\phi$ modulation remains largely unaffected, which provides insight for understanding the difference due to rescattering effects between experimental measurements and theoretical predictions for ρ^0 photoproduction in heavy-ion collisions.

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