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Holographic spin alignment for vector mesons

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We develop a general framework for studying the spin alignment ρ00 for flavorless vector mesons by using the gauge/gravity duality. Focusing on the dilepton production through vector meson decay, we derive the relation between production rates at each spin channel and meson's spectral function, which can be evaluated by holographic models for a strongly coupled system. As examples, we study ρ00 for J/ψ and ϕ mesons, induced by the relative motion to a thermal background, within the soft-wall model. We show that ρ00 in the helicity frame for J/ψ and ϕ mesons have positive and negative deviations from 1/3 at T=150 MeV, respectively, which consequently leads to different properties for their global spin alignments. Further comparisons with experimental data show qualitative agreement for spin parameters λθ and λφ in the helicity and Collins-Soper frames.

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