

Constraints on Intrinsic Charm from the SeaQuest Experiment

Content

A nonperturbative charm production contribution, known as intrinsic charm, has long been speculated but has never been satisfactorily proven. The SeaQuest experiment at FNAL is in an ideal kinematic region to provide evidence of J/ψ production by intrinsic charm. Here, J/ψ production in the SeaQuest kinematics is calculated with a combination of perturbative QCD and intrinsic charm to see whether the SeaQuest data can put limits on an intrinsic charm contribution. J/ψ production in perturbative QCD is calculated to next-to-leading order in the cross section. Cold nuclear matter effects included in this component are nuclear modification of the parton densities, absorption by nucleons, and p_T broadening by multiple scattering. The J/ψ contribution from intrinsic charm is calculated assuming production from a $|uudc\bar{c}\rangle$ Fock state. The nuclear modification factor, R_{pA} , is calculated as a function of x_F and p_T for $p + C$, $p + Fe$, and $p + W$ interactions relative to $p + d$. It is shown that the SeaQuest kinematic acceptance is ideal for setting limits on intrinsic charm in the proton.

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Summary

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