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Quark Energy Loss and Shadowing in Nuclear Drell-Yan Process

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Abstract: The energy loss effect in nuclear matter is another nuclear effect apart from the nuclear effects on the parton distribution as in deep inelastic scattering process. The quark energy loss can be measured best by the nuclear dependence of the high energy nuclear Drell-Yan process. By means of three kinds of quark energy loss parameterizations given in literature and the nuclear parton distribution extracted only with lepton-nucleus deep inelastic scattering experimental data, measured Drell-Yan production cross sections are analyzed for 800 GeV proton incident on a variety of nuclear targets from FNAL E866. It is shown that our results with considering the energy loss effect are much different from those of the FNAL E866, who analyzes the experimental data with the nuclear parton distribution functions obtained by using the deep inelastic lA collisions and pA nuclear Drell--Yan data. Considering the existence of energy loss effect in Drell-Yan lepton pairs production, we suggest that the extraction of nuclear parton distribution functions should not include Drell-Yan experimental data.

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Key words: Drell-Yan, energy loss, nuclear parton distribution functions

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