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Cold nuclear matter effects on QCD processes at fixed target and collider experiments PATRICK MCGAUGHEY, Los Alamos National Laboratory

During the early 1980s, the EMC collaboration made the startling discovery that deep inelastic scattering cross sections were strongly modified in nuclear matter. Since then, numerous experiments have shown that other basic QCD processes, such as Drell-Yan and quarkonium production, are also affected. A variety of models have been developed to interpret these data, including modified parton distributions in nuclei, parton energy loss and scattering, changes to fragmentation functions, etc. However, there is still no real consensus on which of these models are dominant. Several of the same hadronic reactions are being used as probes to elucidate the properties of the quark-gluon plasma created in heavy ion collisions at RHIC and LHC, where nuclear effects have been shown to compete with those due to QGP formation. We will review the recent relevant data from RHIC and the constraints that those place upon theory. We will also discuss upcoming measurements at FNAL, RHIC and LHC that will sample multiple QCD processes with broad kinematic coverage. Those new data should lead us toward the true origin of cold nuclear matter effects and thereby reduce the uncertainties in the extraction of the properties of the QGP.