

DNP19-2019-000481

Abstract for an Invited Paper  
for the DNP19 Meeting of  
the American Physical Society

**Jet energy loss in hot and cold nuclear matter**

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Jet quenching, observed in heavy ion collisions at RHIC and LHC, is a result of substantial final state interactions that cause high energy jets to lose a sizable fraction of their energy to the deconfined matter formed in such collisions. Understanding how jets interact with this QCD matter is crucial in order to quantitatively probe it and is currently an active field of research. In addition to providing a tool to investigate nuclear structure, the study of jet fragmentation in electron-ion collisions may shed light on the mechanisms of jet energy loss and transport properties of cold nuclear matter. I will review in this talk the recent developments in the theory of jet quenching and discuss physics opportunities at a future EIC.