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Leading jets and energy loss at the EIC

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The energy loss mechanism of jets plays a central role in nuclear and high energy physics. We propose direct measurements of the energy loss of leading jets and perform a calculation at next-to-leading logarithmic (NLL') accuracy in the vacuum. The formation of leading jets can be described by jet functions which constitute probability densities and thus allow for a perturbative calculation of the average the energy loss. We identify the following three criteria for a direct measurement of jet energy loss at the cross section level. *i*) We measure a well defined object, the leading jet, where the formation process can be expressed in terms of a probability density. *ii*) In addition, we need a measurement of a hard reference scale with respect to which jet energy loss is defined. *iii*) At leading logarithmic accuracy, we require that the jet energy loss can be identified with parton energy loss. We discuss suitable observables at the Electron-Ion Collider and present numerical results including threshold corrections by making use of a parton shower Monte Carlo approach.

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