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A detailed study of the nucleus at an Electron-Ion Collider

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Much information was gained in the past on the structure of the nucleon, there is little data on the structure of the nucleus, particularly at small-to-intermediate x. The construction of an Electron-Ion Collider (EIC) will allow the exploration of the nucleus across a wide region in x. Not only will nuclear PDFs be extracted, but the high statistics data generated will allow the study of the nucleus in fine detail. At high-x, the fragmentation of fast-moving partons in a nuclear environment will be investigated, something which has particular resonance to jet studies at RHIC and the LHC. At small-x, nucleon data have shown that gluons dominate at intermediate-to-small x. Indeed, it is believed that at some point, this growth is so large that it cannot grow any larger and it will saturate. The studies of saturation in e+p collisions require much high energies than those studied to date. However, the universality of this behaviour is expected to be exhibited in nuclear collisions at much higher values of x and at energies available at an EIC. Comparison to theoretical models have shown that diffractive collisions, in particular, will give clear signals of gluon saturation.

In this talk I will present the current status of the physics capabilities of e+A collisions at an EIC as outlined in the EIC White Paper [1].

[1] A. Accardi at al, http://arxiv.org/abs/1212.1701 (2012)

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