

1. Vasily Morozov, Geometry Tagging for Heavy Ions at JLEIC

Does this project align well with the lab's Strategic Goals?

Yes. The study of the underlying nuclear science enabled by geometry tagging of electron-nucleus collisions can benefit greatly from the Jefferson Lab based EIC design, and as such could lead to a strategic advantage. It would merge the science potential of the hermetic JLEIC design of the integrated detector and interaction region design with the science capabilities of the EIC for the propagation of quarks and gluons through cold nuclear matter, the precocious onset of saturation effects, and coherent diffraction. In particular, demonstrating the extended reach for gluon saturation studies at lower energies with geometry tagging at small impact parameter can offset, or even be superior to, energy reach. However, work on this LDRD proposal has concentrated for now on values of Bjorken- $x > 0.02$. This would remove some of this strategic advantage, albeit more conform to what could be studied also at a 12-GeV Jefferson Lab. A concern could be if the emphasis in year-two of this LDRD would deviate from its JLEIC emphasis.

Is there any aspect of the LOI that needs serious work before a proposal would be competitive (or even allowed)?

This LDRD work is more or less on track in that the BeAGLE code was implemented and work has started to access the excellent potential of the JLEIC IR/detector design for geometry tagging and coherent diffractive processes with GEMC (The JLEIC design has been independently shown to have near-100% acceptance for diffractive e-p processes). Work is ongoing to analyze the tracking results based on the BeAGLE modeling tool and GEMC implementation of the JLEIC detector/IR, and determining the detector sensitivity to nuclear geometry parameters.

However, the proposed second year work in this LOI is a mix of an implementation at 12-GeV experiments, *e.g.*, those approved with CLAS12, and further quantification of the strategic advantage associated with the JLEIC design. More emphasis on the study and quantification whether or not the JLEIC detector and IR designs is acceptable or not for geometry tagging is desirable, at an early stage.

Question: Please consider revising the year-two planning and milestones to have earlier indications of the suitability of the JLEIC integrated detector and interaction region design for geometry tagging in electron-nucleus collisions, and how this can further guide the design concepts for the extended forward detection region of nuclear fragments, between the final-focusing quads and the second focus downstream.