

Laboratory Directed Research and Development Proposal  
Title: \_Study of feasibility and preliminary design of roman pots for the JLAB EIC\_\_\_\_\_

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| **Date:** | 04/18/2016 |
| **Department/Division:** | Physics ENP |
| **Other Personnel:** | Kansas University |
| **Proposal Term:** | **From: 10**/2016  **Through: 9**/2017  **If continuation, indicate year (2nd/3rd)**: |

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| **Division Budget Analyst** | Susan Brown |
| **Phone:** |  |
| **Email:** |  |

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Abstract

*The Roman Pot technique was developped at CERN to detect protons scattered at very forward angle. They consist of a chamber mounted on the beam line with a secondary chamber containing the detectors which can be inserted in and out from a position close from the beam.*

*This technique was used later at Broohaven RHIC and at CERN LHC.*

*Even though the technique proved to be robust some studies need to be done for the JLAB EIC since the expected ion current will reach 500 mA which is about 10 times the current of LHC, feasibility of the technique on the electron side for currents up to 3 A needs also to be studied. Whatever the outcome of this study it will greatly impact the design of the beamline the Jlab EIC.*

# Summary of Proposal

## Description of Project

*The Roman Pot technique was developped at CERN to detect protons scattered at very forward angle. They consist of a double chamber mounted on the beam line with the secondary chamber containing the detectors which can be inserted in and out from a position close from the beam. This allows to isolate the detector from the primary vacuum simplifying cabling and access to the detector while keeping the capability to be very close from the beam.*

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## Expected Results

*After the study we will know the feasibility of the use of Roman Pots for the electron and ion side. If the outcome is positive a preliminary design will be produce to evaluate the cooling and shielding requirements in order to make sure no technical issues are encountered and have a good cost estimate of the system requirements.*

# Proposal Narrative

*No text needed here (unless you want to include an overview paragraph). .*

## Purpose/Goals

*The Roman Pot technique was developped at CERN to detect protons scattered at very forward angle. They consist of a double chamber mounted on the beam line with the secondary chamber containing the detectors which can be inserted in and out from a position close from the beam. This allows to isolate the detector from the primary vacuum simplifying cabling and access to the detector while keeping the capability to be very close from the beam.*

*This technique was used later at Broohaven RHIC and at CERN LHC.*

*The TOTEM experiment at CERN did an extensive study for their roman pots in order to reduce the impedance and RF pickup*

*Even though the technique proved to be robust some studies need to be done for the JLAB EIC since the expected ion current will reach 500 mA which is about 10 times the current of LHC, feasibility of the technique on the electron side for currents up to 3 A needs also to be studied. Whatever the outcome of this study it will greatly impact the design of the beamline the Jlab EIC.*

## Approach/Methods

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## Specific Location of Work

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## Anticipated Outcomes/Results

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# VITA (Lead Scientist)

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# Budget Explanation

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*Do NOT insert the budget spreadsheet here – rather submit it as a separate document.*

References

*Include here (starting on a new page), as appropriate, citations to pertinent publications.*

Attachments

*Include here (if desired), starting on a new page for each, additional information in the form of attachments.*