

References for Yellow Report Efforts

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Disclaimer: this is a living document and we made all efforts to be as inclusive as possible. However, we cannot exclude that some relevant writeups might have been missed. Please let us know if this is the case so we can include them. Within the various sections, papers are listed in no specific order. Links were added to the best of our knowledge but are not guaranteed to be valid in the future.

1. General EIC Documents

EIC White Paper (updated 2014 version):

<http://arxiv.org/abs/arXiv:1212.1701>

Eur. Phys. J. A52 (2016) no.9, 268

Electron-Ion Collider Detector Requirements and R&D Handbook

http://eicug.org/web/sites/default/files/EIC_HANDBOOK_v1.1.pdf

2. Further Introductory Documents

The following documents were part of an introductory documentation series:

Introduction to Interaction Region and Detector Design (*JLEIC-specific*)

<https://jleic-docdb.jlab.org/DocDB/0000/000001/001/JLEIC-InteractionRegionDetectorDesign.pdf>

Detector Requirements for Measurement at the EIC

<https://jleic-docdb.jlab.org/cgi-bin/public/ShowDocument?docid=153>

Forward Electron Detection, Electron Beam Polarimetry, and Luminosity Measurements at JLEIC (*JLEIC-specific*)

<https://jleic-docdb.jlab.org/cgi-bin/public/ShowDocument?docid=55>

Overview on EIC Calorimetry

<https://jleic-docdb.jlab.org/cgi-bin/public/ShowDocument?docid=154>

Electron-Ion Collider (EIC): An Introduction to the Particle Identification System

<https://jleic-docdb.jlab.org/cgi-bin/public/ShowDocument?docid=326>

3. Journal Articles (physics studies relevant for detector requirements)

AI-optimized detector design for the future Electron-Ion Collider: the dual-radiator RICH case

<https://arxiv.org/abs/1911.05797>

Nuclear Structure Functions at a Future Electron-Ion Collider

<http://arxiv.org/abs/arXiv:1708.05654>

Phys. Rev. D96 (2017) no.11, 114005

Measuring the Weizsäcker-Williams distribution of linearly polarized gluons at an electron-ion collider through dijet azimuthal asymmetries

<http://arxiv.org/abs/arXiv:1809.02615>

Phys. Rev. C99 (2019) no.1, 015204

Pion and Kaon Structure at the Electron-Ion Collider

<http://arxiv.org/abs/arXiv:1907.08218>

Eur. Phys. J. A55 (2019) no. 10, 190

Experimental Aspects of Jet Physics at a Future EIC

<http://arxiv.org/abs/arXiv:1911.00657>

Jet angularities in photoproduction at the Electron-Ion Collider

<http://arxiv.org/abs/arXiv:1910.11460>

Semi-inclusive Deep-Inelastic Scattering, Parton Distributions and Fragmentation Functions at a Future Electron-Ion Collider

<http://arxiv.org/abs/arXiv:1902.10663>

Phys. Rev. D99 (2019) no.9, 094004

Photon structure studied at an Electron Ion Collider

<http://arxiv.org/abs/arXiv:1705.08831>

Phys. Rev. D96 (2017) no.7, 074035

Accessing the gluon Sivers function at a future electron-ion collider

<http://arxiv.org/abs/arXiv:1805.05290>

Phys. Rev. D98 (2018) no.3, 034011

Geometry tagging for heavy ions at JLEIC

DOI: <https://doi.org/10.22323/1.316.0175>

PoS DIS2018 (2018) 175

Heavy quark production at an Electron-Ion Collider

<http://arxiv.org/abs/arXiv:1610.08536>

J. Phys. Conf. Ser. 770 (2016) no.1, 012042

Neutron spin structure with polarized deuterons and spectator proton tagging at EIC

<http://arxiv.org/abs/arXiv:1409.5768>

J. Phys. Conf. Ser. 543 (2014) 012007

Polarized light ions and spectator nucleon tagging at EIC

<http://arxiv.org/abs/arXiv:1407.3236>

PoS DIS2014 (2014) 234

Exclusive diffractive processes in electron-ion collisions

<http://arxiv.org/abs/arXiv:1211.3048>

Phys. Rev. C87 (2013) no.2, 024913

The dipole model Monte Carlo generator *Sartre*

<http://arxiv.org/abs/arXiv:1307.8059>

Comput. Phys. Commun. 185 (2014) 1835-1853

Transverse-momentum-dependent parton distribution/fragmentation functions at an electron-ion collider

<http://arxiv.org/abs/arXiv:1101.4199>

Eur. Phys. J. A47 (2011) 35

4. Detector R&D and Detector Concepts Related Papers and Links

4.1 Links to EIC Detector Meetings

Links to EIC Detector Meetings with talks/slides on detector concepts:

- [December 1, 2017 at Temple University](#)
- [Detector Workshop CUA, July 29, 2018](#)

4.2 Tracking Related

Results from a Prototype Combination TPC Cherenkov Detector with GEM Readout

<http://arxiv.org/abs/arXiv:1904.13229>

IEEE Trans. Nucl. Sci. 66 (2019) no.8, 1984-1992

Design Studies for a TPC Readout Plane Using Zigzag Patterns with Multistage GEM Detectors

<https://doi.org/10.1109/TNS.2018.2846403>

IEEE Trans. Nucl. Sci. 65 (2018) no.7, 1416-1423

A Study of a Mini-Drift GEM Tracking Detector
IEEE Transactions on Nuclear Science 63.3 (June 2016), pp. 1768-1776. ISSN: 0018-9499.
[doi: 10.1109/TNS.2016.2550503](https://doi.org/10.1109/TNS.2016.2550503).

A Prototype Combination TPC Cherenkov Detector with GEM Readout for Tracking and Particle Identification and its Potential Use at an Electron Ion Collider
[arXiv:1512.05309](https://arxiv.org/abs/1512.05309) [physics.ins-det]

Initial studies of a short drift GEM tracking detector
2014 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC). Nov. 2014, pp. 1-2.
[doi: 10.1109/NSSMIC.2014.7431059](https://doi.org/10.1109/NSSMIC.2014.7431059).

Test beam study of a short drift GEM tracking detector
2013 IEEE Nuclear Science Symposium and Medical Imaging Conference (2013 NSS/MIC). Oct. 2013, pp. 1
[doi: 10.1109/NSSMIC.2013.6829463](https://doi.org/10.1109/NSSMIC.2013.6829463).

Low-mass GEM detector with radial zigzag readout strips for forward tracking at the EIC
2017 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC 2017) Atlanta, Georgia, USA, October 21-28, 2017. 2017.
[arXiv: 1711.05333](https://arxiv.org/abs/1711.05333) [physics.ins-det].

A GEM readout with radial zigzag strips and linear charge-sharing response
Nucl. Instrum. Meth. A887 (2018), pp. 184-192.
[arXiv: 1708.07931](https://arxiv.org/abs/1708.07931) [physics.ins-det].

R&D on GEM detectors for forward tracking at a future Electron-Ion Collider
Proceedings, 2015 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC 2015): San Diego, California, United States. 2016, p. 7581965.
doi: 10.1109/NSSMIC.2015.7581965
[arXiv: 1511.07913](https://arxiv.org/abs/1511.07913) [physics.ins-det].

Performance of a Large-area GEM Detector Read Out with Wide Radial Zigzag Strips
Nucl. Instrum. Meth. A811 (2016), pp. 30-41.
[doi: 10.1016/j.nima.2015.11.157](https://doi.org/10.1016/j.nima.2015.11.157).
[arXiv:1508.07046](https://arxiv.org/abs/1508.07046) [physics.ins-det].

Study of MicroPattern Gaseous detectors with novel nanodiamond based photocathodes for single photon detection in EIC RICH
Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment (2019). ISSN: 0168-9002.
[doi: https://doi.org/10.1016/j.nima.2019.03.022](https://doi.org/10.1016/j.nima.2019.03.022).

<http://arxiv.org/abs/arXiv:1812.04552> [physics.ins-det]

Construction of a Triple-GEM Detector Using Commercially Manufactured Large GEM Foils
[arXiv: 1806.01892](http://arxiv.org/abs/1806.01892) [physics.ins-det].

Construction of Triple-GEM Detectors Using Commercially Manufactured Large GEM Foils
Proceedings, 2016 IEEE Nuclear Science Symposium and Medical Imaging Conference:
NSS/MIC 2016: Strasbourg, France. 2016, p. 8069743.
doi: 10.1109/NSSMIC.2016.8069743.
[arXiv: 1612.03776](http://arxiv.org/abs/1612.03776) [physics.ins-det].

Performance in test beam of a large-area and light-weight GEM detector with 2D stereo-
angle (UV) strip readout
Nucl. Instrum. Meth. A808 (2016), pp. 83-92.
doi: 10.1016/j.nima.2015.11.071.
[arXiv: 1509.03875](http://arxiv.org/abs/1509.03875) [physics.ins-det].

Combination of two Gas Electron Multipliers and a Micromegas as gain elements for a time
projection chamber
Nucl. Instrum. Meth. A834 (2016), pp. 149-157.
doi: 10.1016/j.nima.2016.08.007.
[arXiv: 1603.08473](http://arxiv.org/abs/1603.08473) [physics.ins-det].

4.3 PID related (incl. photo sensors)

A new Transition Radiation detector based on GEM technology
<https://doi.org/10.1016/j.nima.2019.162356>
Nucl. Instrum. Meth. A942 (2019) 162356

High-performance DIRC detector for the future Electron Ion Collider experiment
<https://doi.org/10.1088/1748-0221/13/04/C04018>
JINST 13 (2018) no.04, C04018

Design and R&D of RICH detectors for EIC experiments
<https://doi.org/10.1016/j.nima.2017.03.032>
Nucl. Instrum. Meth. A876 (2017) 237-240

Modular focusing ring imaging Cherenkov detector for electron-ion collider experiments
<https://doi.org/10.1016/j.nima.2017.07.001>
Nucl. Instrum. Meth. A871 (2017) 13-19

The MPGD-based photon detectors for the upgrade of COMPASS RICH-1 and Beyond
Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers,
Detectors and Associated Equipment (2018). ISSN: 0168-9002.

doi: <https://doi.org/10.1016/j.nima.2018.10.092>.
<http://www.sciencedirect.com/science/article/pii/S0168900218314062>.

Fast-timing microchannel plate photodetectors: design, fabrication and characterization
Review of Scientific Instruments, 90, 043109 (2019)
<https://doi.org/10.1063/1.5063825>

Characteristics of fast timing MCP-PMTs in magnetic fields
NIMA, 929, 84(2019)
<https://doi.org/10.1016/j.nima.2019.03.045>

Ring Imaging Cherenkov Detector Technologies for Particle Identification in the Electron-Ion Collider Experiments
21st Particle and Nuclei International Conference (PANIC 2017)
International Journal of Modern Physics: Conference Series, Vol. 46 (2018) 1960080.
[DOI: 10.1142/S2010194518600807](https://doi.org/10.1142/S2010194518600807).

Rate capability and magnetic field tolerance measurements of fast timing microchannel plate photodetectors
<https://doi.org/10.1016/j.nima.2017.10.059>

Particle Identification for a future EIC detector
Proceedings of DIRC2017, JINST 13, C03018 (2018).
<https://doi.org/10.1088/1748-0221/13/03/C03018>

MCP-PMT Studies at the High-B Test Facility at Jefferson Lab
Proceedings of the International Workshop on Fast Cherenkov Detectors - Photon detection, DIRC design and DAQ, November 11–13, 2015, Giessen, Germany.
JINST 11, 2016
<http://dx.doi.org/10.1088/1748-0221/11/03/C03061> .

High-performance DIRC detector for the future Electron Ion Collider
Proceedings of the International Workshop on Fast Cherenkov Detectors - Photon detection, DIRC design and DAQ, November 11–13, 2015, Giessen, Germany.
[JINST](#)

Development of a low-cost fast-timing microchannel plate photodetector
[Nucl. Instrum. Meth. A 824 \(2016\) 159-161](#).

High-performance DIRC detector for use in an Electron-Ion Collider
Proceedings for ICHEP2016 (38th International Conference on High Energy Physics), August 3-10, 2016, Chicago, IL
[Proceedings of Science](#).

Development and testing of cost-effective, 6cm× 6cm MCP-based photodetectors for fast timing applications

[arXiv:1604.07738](https://arxiv.org/abs/1604.07738)

Nucl. Instrum. Meth. A 804 (2015) 84–93.

4.4 Calorimeter related

Scintillating crystals/glass for the Neutral Particle Spectrometer and EIC

arXiv:1911.xxxx (number to be added this Tuesday)

To be submitted to Nucl. Instrum. Meth. this month (November 2019)

4.5 Miscellaneous

A Magnetic Field Cloak for Charged Particle Beams

<http://arxiv.org/abs/arXiv:1707.02361>

Nucl. Instrum. Meth. A877 (2018) 149-156

4.6 Detector R&D Projects and Related Links

For further documentation of the EIC Detector R&D program please see:

https://wiki.bnl.gov/conferences/index.php/EIC_R%25D

To learn about the various supported projects please see the progress reports that summarizes the efforts: <https://wiki.bnl.gov/conferences/index.php/EIC-Detector-Proposals>

For a quicker overview it is helpful to browse through the referring presentations:

<https://wiki.bnl.gov/conferences/index.php/Meetings>

Here's a list of existing and past projects that allows for a more focused search:

R&D Project	Topic	Status
eRD1	EIC Calorimeter Development	active
eRD2	A Compact Magnetic Field Cloaking Device	completed
eRD3	Design and assembly of fast and lightweight forward tracking prototype systems for an EIC	completed (merged with eRD6)
eRD6	Tracking and PID detector R&D towards an EIC detector	active
eRD10	(Sub) 10 Picosecond Timing Detectors at the EIC	completed (merged into eRD14)
eRD11	RICH detector for the EIC'S forward region particle identification - Simulations	completed (merged into eRD14)
eRD12	Polarimeter, Luminosity Monitor and Low Q2-Tagger for Electron Beam	completed

eRD14	An integrated program for particle identification (PID) for a future Electron-Ion Collider (EIC) detector	active
eRD15	R&D for a Compton Electron Detector	completed
eRD16	Forward/Backward Tracking at EIC using MAPS Detectors	active
eRD17	BeAGLE: A Tool to Refine Detector Requirements for eA Collisions in the Nuclear Shadowing/Saturation Regime	active
eRD18	Precision Central Silicon Tracking & Vertexing for the EIC	active
eRD19	Detailed Simulations of Machine Background Sources and the Impact to Detector Operations	completed (see eRD21)
eRD20	Developing Simulation and Analysis Tools for the EIC	active
eRD21	EIC Background Studies and the Impact on the IR and Detector design	active
eRD22	GEM based Transition Radiation Tracker R&D for EIC	active
eRD23	Streaming Readout for EIC Detectors	active
eRD24	Silicon Detectors with high Position and Timing Resolution as Roman Pots at EIC	active