

TPC Central Tracker

| TPC Development for EIC | |
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| Timeline | |
| Year | Tasks |
| 2021 | Continue testing readout options (4 GEM vs 2GEM + MMG, zigzag charge sharing, etc) using small scale prototype. Provide input on TPC design for hybrid detector design with TPC and Si inner tracker. In parallel, we also plan to continue to investigate the applicability of interleaved readout planes for a planar tracker option at EIC. |
| 2022 | Design and build prototype hybrid tracker and test in test beam. Continue with engineering design and simulations for full scale detector. |
| 2023 | Revise engineering design based on results of prototype tests and design full scale prototype. At this point, depending on the viability of a TPC tracker option at EIC, we will also consider shifting our focus toward MPGD-based planar tracker options with optimized anode geometries. |
| 2024 | Build full scale prototype and test in test beam if possible. Revise final design based on prototype tests. |
| 2025 | Complete final design and prepare for construction. |

Cylindrical MMG Barrel Tracker

| Year | Barrel Micromegas Tracker |
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| 2021 | <p>Ultra light:</p> <ul style="list-style-type: none">- Goal: from 0.5% X0 (Clas12) to 0.05% X0 with this R&D- Full simulation of ultra light MM design- Design and construction of stretch bulked Kapton demonstrator (no FR4) <p>2D readout design studies:</p> <ul style="list-style-type: none">- Procurement of large pads readout PCBs- Finalize 2D zigzag readout pattern studies |
| 2022 | <p>Ultra light:</p> <ul style="list-style-type: none">- Aluminium based strips- Thin aluminium mesh manufacturing with laser ablation <p>Readout studies</p> <ul style="list-style-type: none">- Bulking and test of large pads readout <p>Cylindrical MM:</p> <ul style="list-style-type: none">- Design of MM tracker support structure within EIC detector |
| 2023 | <p>Ultra light:</p> <ul style="list-style-type: none">- Prototype construction <p>Cylindrical MM:</p> <ul style="list-style-type: none">- Final prototype with 2D zigzag readout |

Cylindrical μ RWELL Barrel Tracker

| TASK | Development of Cylindrical μ RWELL |
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| YEAR | detailed tasks |
| 2021 | Completion of mechanical mockup |
| | Procure components and begin building small-radius functional cylindrical μ RWELL |
| 2022 | Complete construction of small cylindrical prototype |
| | Commission small cylindrical prototype |
| | Perform beam test of small cylindrical prototype |
| | Analyse beam test results |
| 2023 | Design and procure materials for full-size mechanical mock-up |
| | Finish analyzing beam test results |
| | Build full-size mechanical mock-up and evaluate |
| 2024 | Design and build large-radius cylindrical μ RWELL prototype |
| | Complete large cylindrical μ RWELL prototype |
| 2025 | Perform beam test of large cylindrical μ RWELL prototype |
| | Complete analysis from large cylindrical μ RWELL prototype test beam Begin design of production detectors |

Planar μ RWELL End cap Tracker

| TASK | R&D on Large & low-mass μRWELL for End cap Trackers 1-) Large & low-mass μ RWELL detectors 2-) Development of high performance capacitive-sharing anode readout |
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| YEAR | detailed tasks - (date are expected milestone) |
| 2021 | Large μRWELL |
| | Dec 2021: Design of large prototype (synergy with prototyping at Jlab) |
| | Capacitive-sharing readout |
| | Jun 2021: Study various small prototypes in beam test FNAL |
| | Dec 2021: Analyse beam test results |
| 2022 | Dec 2021: Optimization & design of large U-V strip capacitive-sharing readout |
| | Jun 2022: construction of large trapezoidal μ RWELL with U-V strip readout |
| | Jul 2022: Test performances of large μ RWELL in beam test @ FNAL |
| 2023 | Dec 2022: Analyse beam test results |
| | July 2023: Publication of test beam results on large μ RWELL in peer-review paper |
| | Dec 2023: Complete the R&D on large μ RWELL for EIC End Cap Tracker |

Large GEM End Cap Tracker

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| TASK | R&D on Large & low-mass GEMs for EIC End Cap Trackers 1 - UVa prototype with U-V strips readout 2 - FIT prototype with carbon Fiber frames & zigzag strip readout |
| YEAR | detailed tasks - (date are expected milestone) |
| 2021 | UVa prototype |
| | Jun 2021: Test performance in beam test at FNAL |
| | Dec 2021: Finalize FNAL test beam data analysis |
| | FIT prototype |
| Jun 2021: Complete the refurbishment & test performance at FNAL | |
| Dec 2021: Finalize FNAL test beam data analysis | |
| 2022 | UVa GEM prototype & FIT GEM prototype |
| | Jul 2022: Publication of beam test results in peer-reviewed journal |
| | Completion of the generic large, low-mass GEM R&D program |

Particle ID

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| TASK | Development of MPGDs for High Momentum Hadron PID, Development of MPGD sensors of single photons |
| YEAR | detailed tasks |
| 2021 | complete the construction of the prototype version 2 |
| | initial lab test of prototype version 2 |
| | read-out chain based on VMM3 FE fully operational |
| 2022 | complete the lab test of prototype version 2 |
| | validate the read-out of single photoelectron signal with VMM3 |
| 2023-2024 | if sensor selected for the EIC detector, detailed engineering |

Particle ID

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| TASK | Development of MPGDs for High Momentum Hadron PID, New Photocathode Materials for gaseous detector |
| YEAR | detailed tasks |
| 2021 | H-ND effective QE in different gas mixtures |
| | H-ND effective QE after thermal cycle in inert gas |
| | construction of a complete detector with H-ND photocathodes |
| | coating substrate sample with CsI for comparative studies |
| 2022 | performe the comparative studies of H-ND and CsI |
| | lab test of the complete detector with H-ND photocathodes |
| | quantify the radiation hardness of H-ND photocathodes |
| 2023 | systematic measurements of QE of H-ND with different grain size |
| | systematic measurements of QE of H-ND with different graphite content |
| | systematic measurements of QE of H-ND from different providers |
| | systematic measurements of QE of H-ND with different B doping |
| 2024 | completion of the 2023 exercises |