

AI for Analysis and Reconstruction

➤ AI for reconstruction

❑ Tracking (Louis-Guillaume Gagdon, Gagik Gavalian)

- Cluster finding, noise reduction
- Track finding
- Track fitting

❑ AI for calorimeter (Dmitry Romanov , William Phelps)

- Cluster finding and separation
- Particle ID with calorimeter

❑ AI for Particle ID (Andrew Schick , Cristiano Fanelli , Yulia Furletova, Lukasz Graczykowski)

- dE/dx
- Cherenkov
- TOF
- Transition radiation +tracking

➤ AI for Jets and heavy-quark jets (Stephen Sekula , Benjamin Nachman)

❑ More complex objects with information from multiple sub-detectors: vertex, tracker, EMCAL/HCAL, PID

❑ jet sub-structure

➤ AI for analysis (Sergey Gleyzer, Abdullah Farhat)

❑ For Kinematic reconstruction

❑ For event selection and trigger

Most reconstructions tasks relevant for EIC covered

Important input to complex analyses at an EIC

AI for Analysis and Reconstruction: Thoughts and Next Steps

- **Scrutinize need and benefit for EIC in detail**
 - Where could AI have the biggest impact, prioritization
 - Multiplicity/density dependence important
 - Choice of methods/techniques that are optimal for EIC environment
- **Moving towards online processing**
 - Hardware (FPGA, GPUs)
 - Background levels ?
 - Detector calibration ?
 - Noise reduction (de-noiser for synchrotron radiation?)
- **Systematics uncertainties?**
- **Searches: How to select BSM ?**
- **AI needs often highly accurate/realistic simulations**
 - MC vs embedding
 - Event generators on ep/eA?
- **Education of workforce**
- **Role of EICUG**