

Consortium Accomplishments + Berkeley Overview



Silicon tracker achievements in 2022

- Designed & demonstrated performant layout
 - Simulations and reconstruction software development
 - Performance & Background studies
- Generic & Project Engineering R&D secured
 - Conceptual design of mechanics & cooling
 - Cooling & material bench tests
 - Procure parts & techniques for in-beam sensor tests
- Established collaboration with UC Davis on R&D
- Established leadership roles in EIC Silicon Consortium, Tracking working group & Tracking software

- Demonstrated W/SciFi technology; chosen for ePIC Ecal
 - Validated performance with simulations
 - Constructed & tested prototype parts
- Established leadership role in Calorimetry working group and Ecal software
- Conceptual design of Calorimeter Insert
 - Validated performance with simulations
 - Constructed & tested prototype building blocks
 - Published paper in NIM A

update!

- Established theory-experiment collaborations
 - Neutrino-tagged jets at EIC
 - Energy-energy correlators at EIC
- Photoproduction (coherent and incoherent)
- Tagged structure functions studies
- Heavy flavor physics studies

update!

- Sensor development
 - Develop large area sensor for EIC, for review in 2024
 - Bench and beam test & feedback to designers
 - Test set-up development for ER-1
- Finalize layout
 - Optimize resolution & efficiency, including backgrounds
- Mechanical design & simulation of mechanics
 - Overall support & cooling design
 - Selection of materials
 - Develop aluminum conductor flex cables
- Prepare for EIC CD-2 in 2024

Calorimeter plans for 2023

update!

- Publish energy-energy correlators paper

update!

- We need to take advantage of this opportunity!
- More discussion during this meeting

update!

UCB PD: *Preeti Dhankher*, Minjung Kim

LBNL PD: Rey Cruz Torres, Wenqing Fan, Shujie Li, Kyle Lee*, Yuanjing Ji, Tyler Hague, Peng Miao

UCB Grad students: *Dhruv Dixit*, Ezra Lesser, Beatrice Liang Gilman, Tucker Hwang, Anjali Nambrath, Emma Yeats

Alwina Liu graduated in December

Undergrad students: Kyle Devereaux, Richard Lew*, Remi Seddigh*, Benjamin Sterwerf, Andy Park, Oscar Tapia Gallegos, Shreya Puranam

LBNL staff: Ernst Sichtermann, Spencer Klein, John Arrington, Nikki Apadula, Yue Shi Lai¹, Yuan Mei, Xin Dong, Barbara Jacak

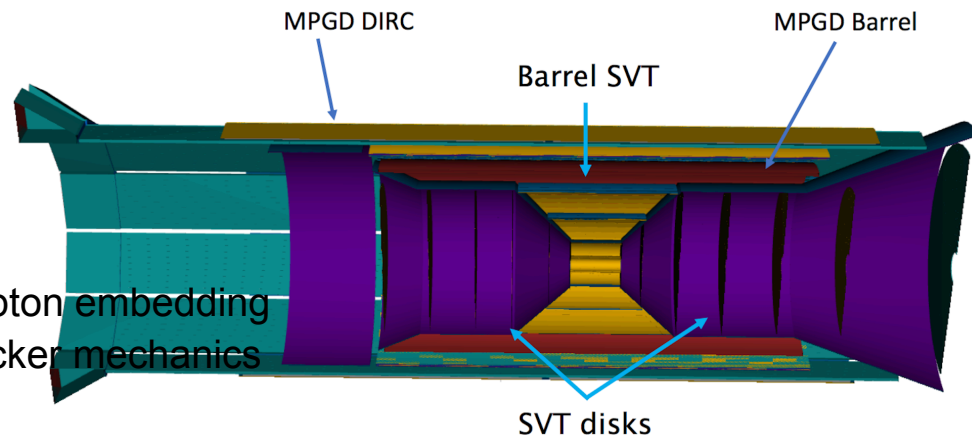
Leadership roles

- Working group conveners
 - Spencer Klein, John Arrington
- Tracking software liaison: Shujie Li
- Silicon Consortium co-chair: Ernst Sichtermann
- Generic & eRD111 lead: Nikki Apadula
- CC members
 - Ernst Sichtermann, John Arrington, Barbara Jacak
- Charter Committee: Barbara Jacak
- Running for ePIC office
 - Ernst Sichtermann for CC chair
 - Barbara Jacak for Deputy Spokesperson (with Ken) *Vote for us!!*

- EIC, ALICE, STAR, sPHENIX, Jlab experiments
- HI Physics goals
 - Transport properties of dense QCD matter (hot and cold)
 - Jet evolution and modification in dense matter
 - Hadronization process
- Hadron Physics Goals
 - Where is the proton's spin?
 - Short range correlations in nuclei & quark-level understanding
 - Parity violating asymmetry in e-e scattering for \sin^2_w at low Q^2
 - Source of EMC effect
- Our approach is to study with **available machines now** and design, build, and analyze EIC experiment to study with **e+p, A**

Silicon tracker design for EIC

- Optimize layout
- Simulate tracking performance
 - Momentum, position, angular resolution
 - Track length & projections
 - Pattern recognition (track finding)
 - Backgrounds
 - ACTS tracking software
 - Vertexing
- R&D on mechanics
 - Tiling strategies
 - Cooling
 - Support structures; carbon foam, Kapton embedding
 - Ansys & engineering modeling of tracker mechanics



- Bench tests

- Prepare test boards for EIC
- Bench (& beam) tests of MLR1 with ALICE colleagues
- Duplicate Trieste set up at LBNL

- Beam tests

- Prepare for beam tests with 50 MeV protons at 88-inch cyclotron
 - Coordinate R&D studies for both ALICE & EIC
- Collaborate with LANL to prepare telescope
- Carry out beam test, coordinate goals with ALICE colleagues
- Same for ER-1, when available
- Analyze and publish the results!

- Energy-energy correlators at the EIC
- Heavy flavor measurements
 - Including detector specifications
- Jet probes of cold nuclear matter
- Photoproduction (coherent and incoherent)
- Tagged structure functions
- Collaborate on electron reconstruction software