

LBNL

Ernst Sichtermann



People:

John Arrington joined LBNL late September,

James Symons stepped down as ALD, continued interest in EIC

Matthew Kelsey

Sooraj Radhakrishnan

Yuanjing Yi

Xin Dong



extensive Heavy-Flavor studies,
Matthew Kelsey (talk this afternoon)

Leo Greiner

Alberto Collu



eRD25 continued R&D, Si consortium

Continued strong UCB ties; e.g. Rey Cruz-Torres (talk this afternoon)

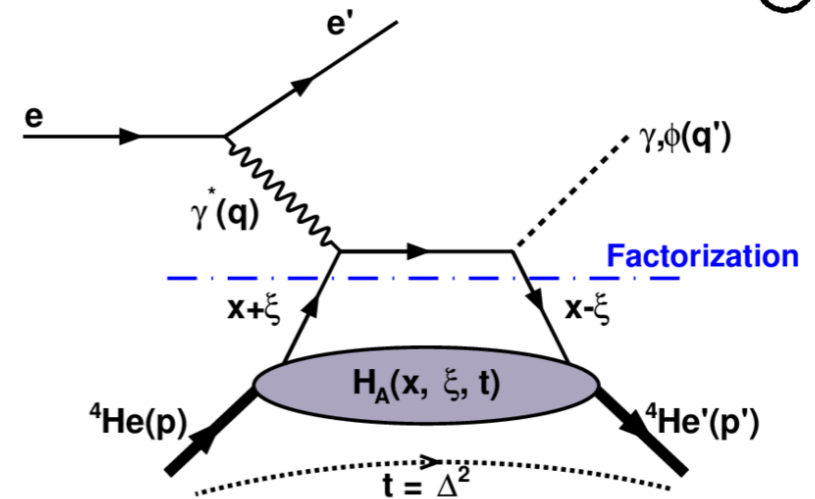
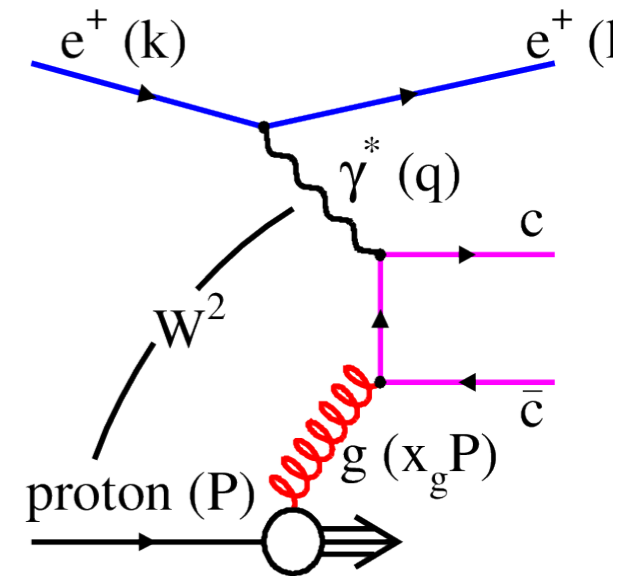
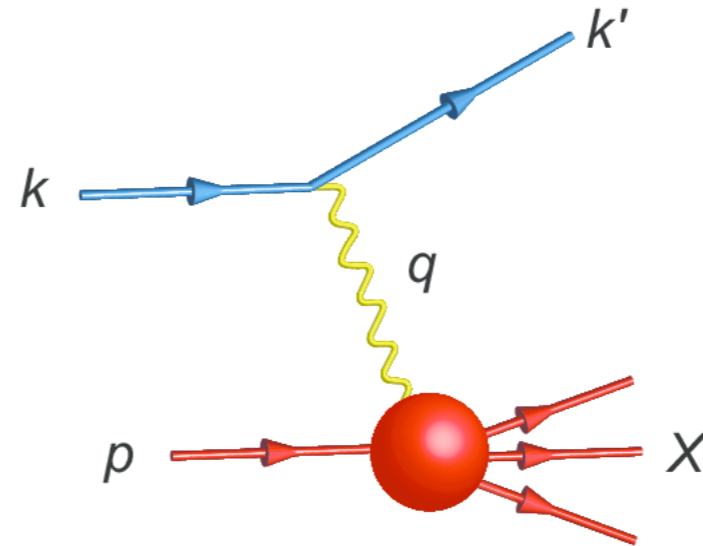
The usual suspects: Barbara Jacak, Spencer Klein, Yue Shi Lai, Nu Xu, Feng Yuan, E.S.

Nuclear Physics Interests:

By probe:

- Scattered electron
- Current jets
- Heavy Quark production
- Exclusive vector meson production

A range of physics topics, really.



LBNL EIC past involvement:

1. Make and establish EIC science case (Feng, Ernst),
2. Forward/backward tracking (Barbara, Ernst, Yue Shi, students),
3. One LBNL supported LDRD (Spencer et al.),
 - STAR-light evolved to eSTAR-light,
 - some effort related to Si-based tracking, jet-studies,
4. eRD16 (Barbara, Ernst, Yue Shi)
5. EIC User Group roles (Barbara, Ernst)

My take on current status:

1. Now is the time,
2. Opportunity to “think big” in terms of tracking continues to exist,

Near-term plans:

1. eRD16 effort is simulating all-Si tracker performance,
 - (some) overlap with SIDIS and jet studies, displaced vertices, YR
2. eRD16 and eRD18 intend to proceed as a consortium; inclusive.
3. Reasonably well-integrated in and aligned with Yellow-Report effort,
4. Anticipate EIC User Group roles going forward.

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EIC User Group roles:

1. Extensive heavy quark simulation studies - c.f. Matt Kelsey's
2. Extensive tracking studies - c.f. Rey Cruz-Torres's talk

└ well aligned with and essential to ongoing Yellow Report effort,
quite beautiful complementarity across UC e.g. with jet studies,

3. Yellow Report co-conveners: Leo Greiner (tracking), Spencer Klein
(diffractive reactions & tagging), E.S. (jets and heavy quarks)

└ complementarity: Ken Barish (UCR), theory groups

4. LBNL/UCB-hosted 4th and final Yellow Report Workshop (Nov. 19-21)

5. Steering committee members: John Arrington, Barbara Jacak

Tracking:

Space is at a premium at the EIC and the baseline general purpose detector(s) will need to be: compact, tightly integrated, low-mass, high resolution, and large acceptance,

eRD25 aims to develop a well-integrated and large-acceptance EIC vertexing and tracking detector concept, based on Monolithic Active Pixel Sensors (MAPS) at the 65 nm node,

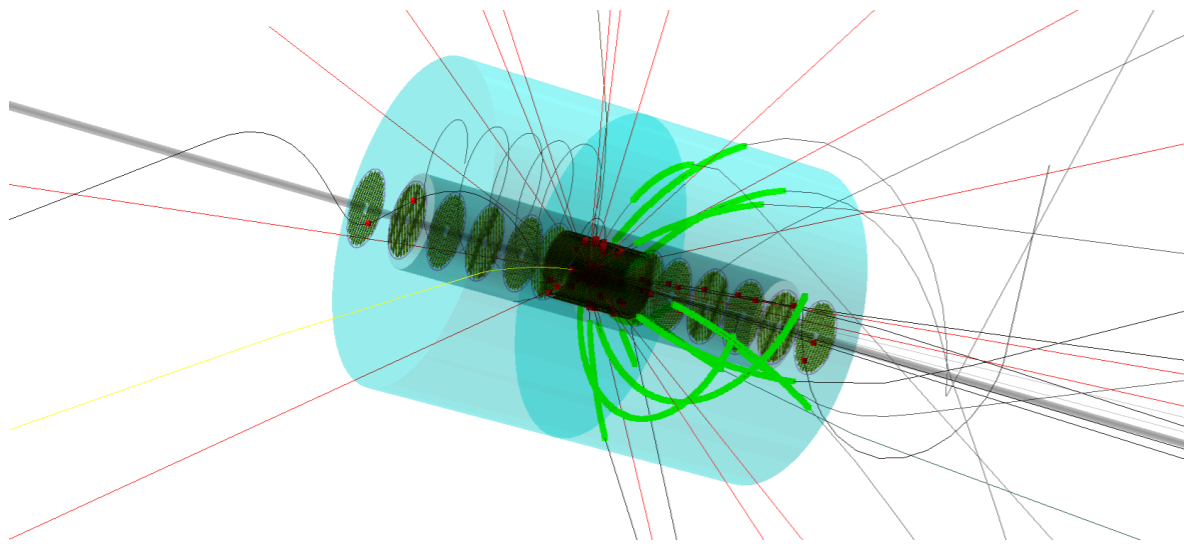
Sensor R&D aims to leverage ALICE-ITS3 and to fork off for EIC,
many areas of (physics-driven) commonality,
65nm technology,
10 μ m pixel-size turns out fortuitous with large-r EIC beam pipe

Continued simulations towards physics-optimized conceptual layout,

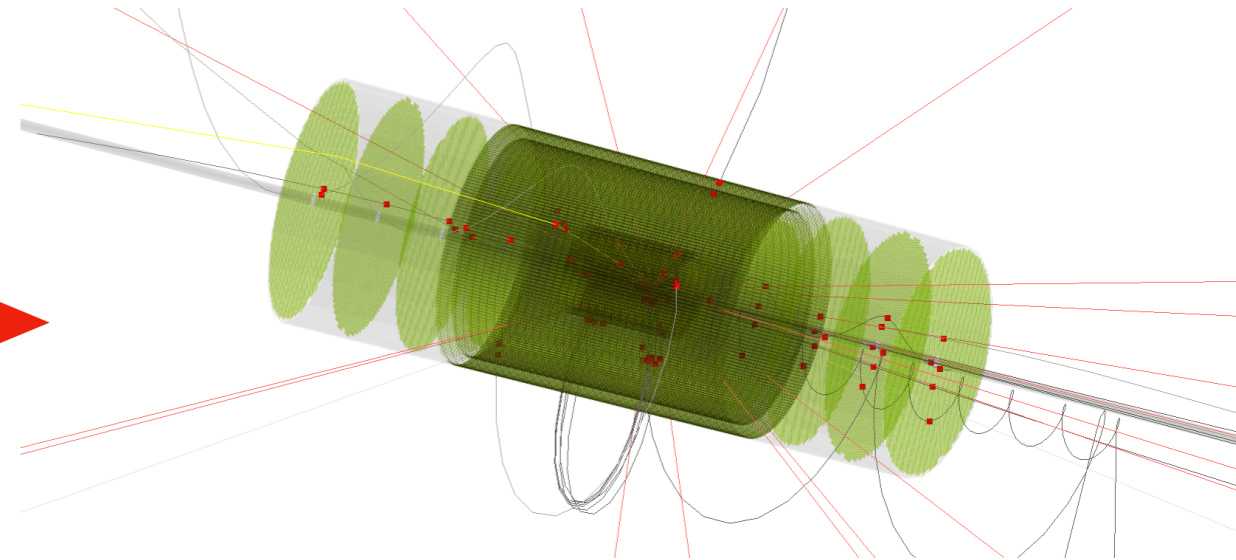
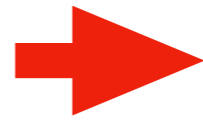
Attention to services and supports, constructibility;
integration e.g. with RICH + large-z GEM

Attractive option for compact all-silicon tracker - *“what if EIC could benefit from superior position and pointing resolution along the full track trajectory?”*

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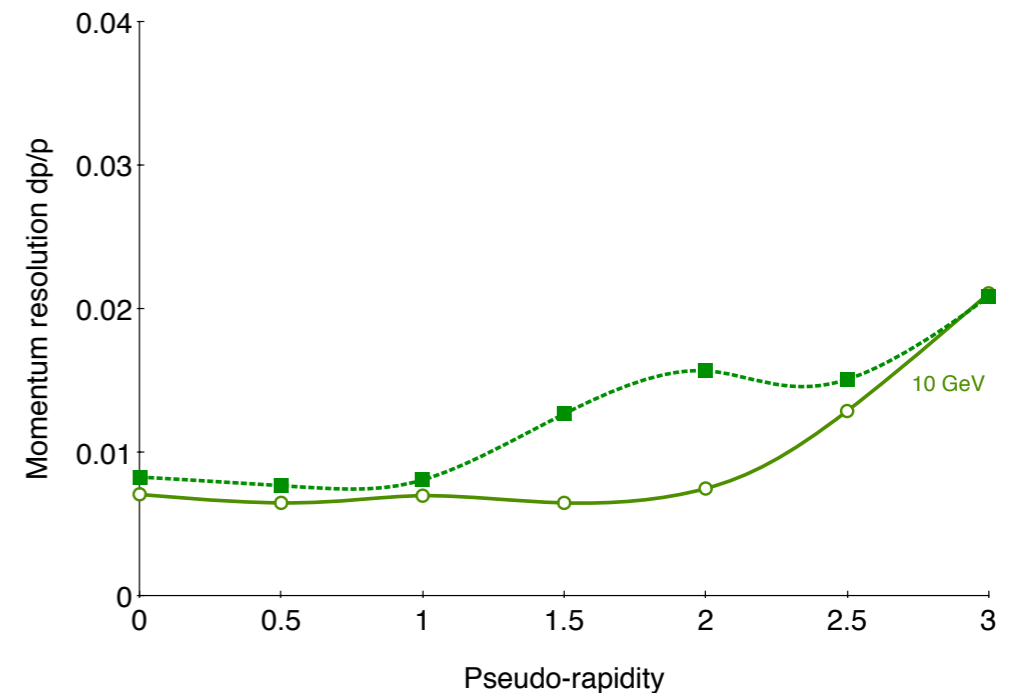


3T BeAST with ~80 cm outer radius TPC,
MAPS inner barrels & disks



~45 cm outer radius MAPS barrels and disks,
identical in length, $-1.2 < z < 1.2$ m
MAPS area ~15 m²

- Similar or better momentum and angular performance,
- Identical vertexing performance,
- Radially more compact, $\sim 80 \rightarrow \sim 45$ cm,
- Thereby freeing ~ 35 cm that could be used for alternate purposes such as PID,
- Opportunities for complementary baseline detector concepts
- Realization will be a multi-institution and international endeavor, basically from its inception,



Closing comments:

1. LBNL effort has intensified since our January meeting, both for simulation and instrumentation,
2. Yellow-Report effort is in full swing, (all-)Silicon concepts and associated studies are likely to have a place,
3. Eol: yeah - that, too (in progress),
4. Timely to look ahead to collaboration-forming (Spring '21),



5. PID instrumentation is (thus far) largely outside UC consortium.