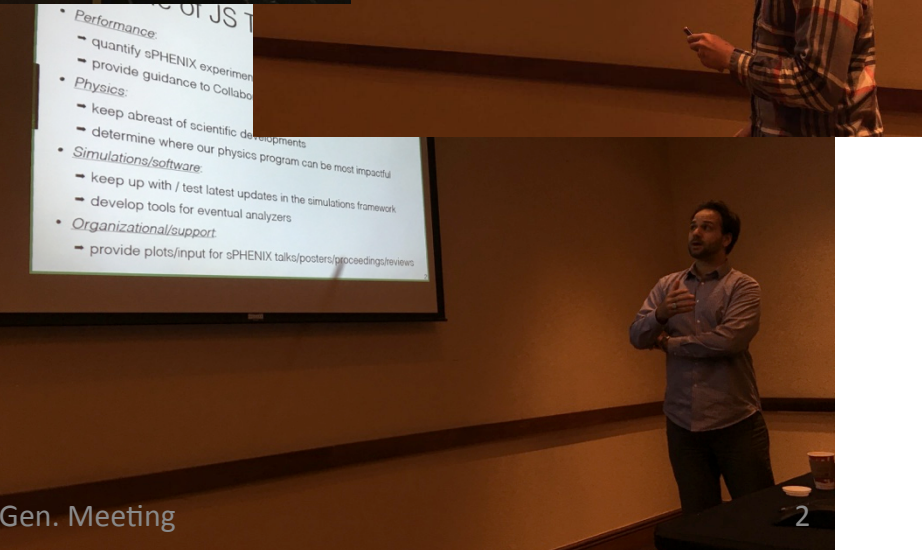
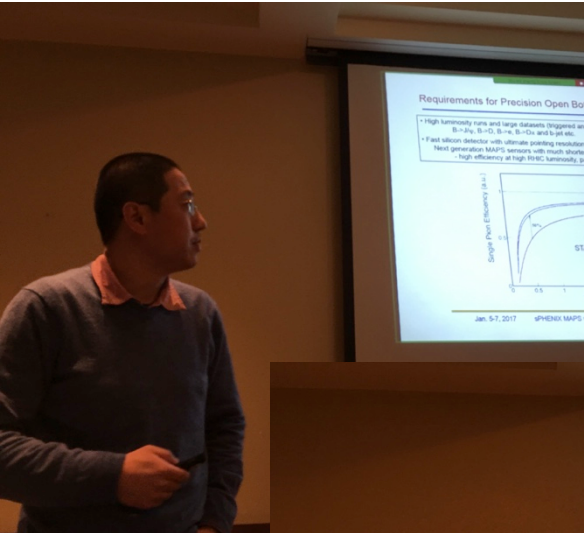
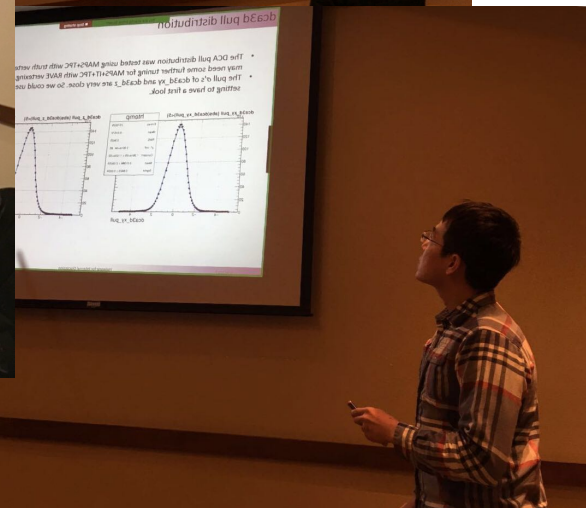
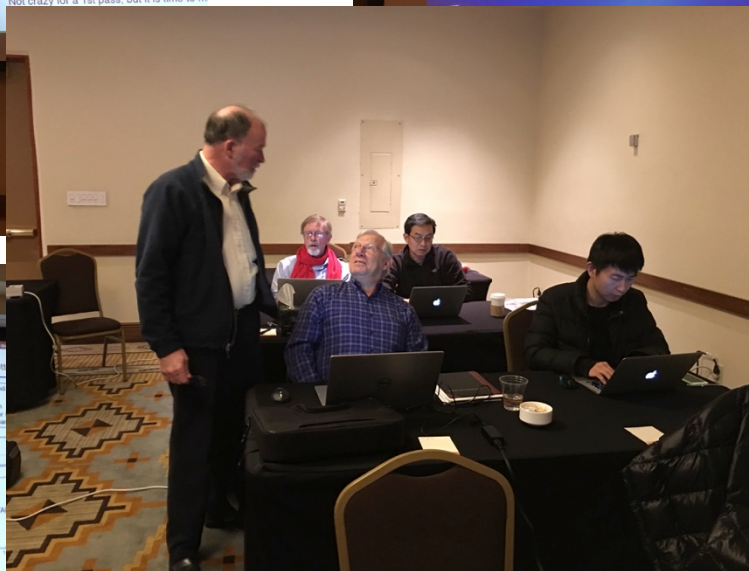
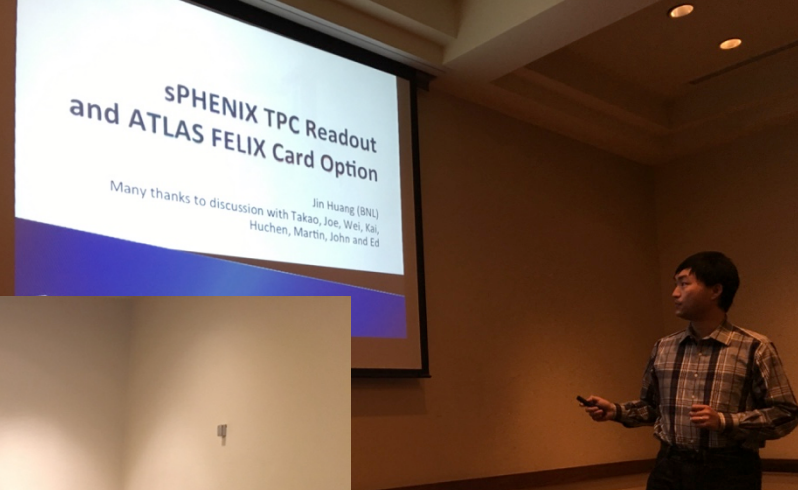
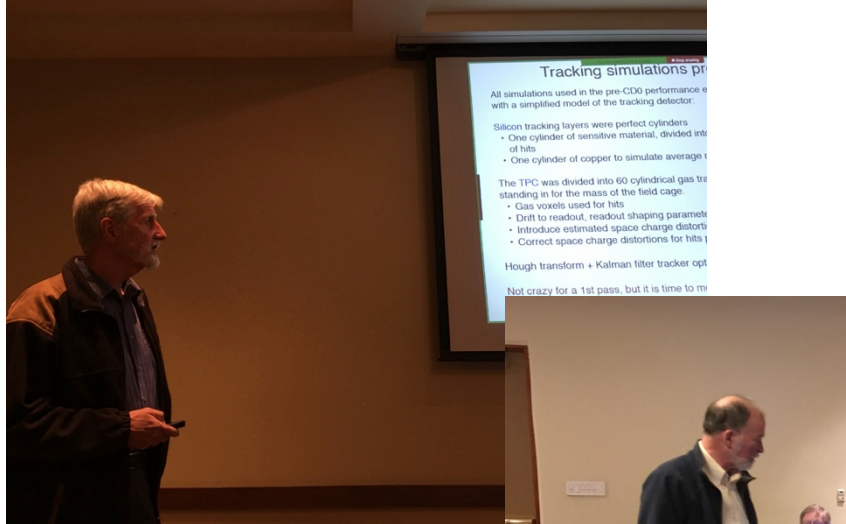


Goals of the Workfest

<https://indico.bnl.gov/conferenceDisplay.py?ovw=True&confId=2641>

- MAPS detector group
 - Make significant progress on MAPS MIE proposal
 - Update the cost and schedule to be ready for discussion with DOE in Feb budget meeting
 - Develop additional physics cases for MAPS detector beyond sPHENIX scientific proposal
- HF-jet topical group
 - Produce near final b -jet tagging performance plot for MAPS proposal and QM2017 conference
 - Advance the tracking detector simulation towards new baseline simulation configuration
 - Develop B-meson simulations
- Well attended by experts, ~20+ people
 - BNL, LBNL, MIT, FSU, Colorado, GSU, NMSU, UCLA, LANL
- Agenda
 - Day-1: Intro and status reports, working sessions
 - Day-2: parallel working sessions – Sim and MIE
 - Day-3: parallel working sessions – Sim and MIE

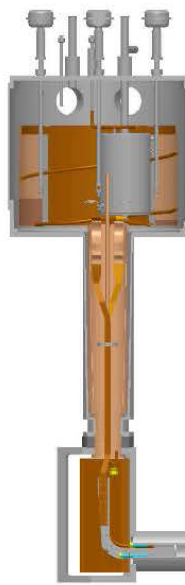




Major Tasks and Lead Institutions for sPHENIX MAPS Project (MIE Writing)

- MAPS chips/stave production
 - LANL/ALICE (Ming Liu, Cesar da Silva)
- Readout integration and testing
 - LANL, BNL, UT-Austin, U-Colorado (Mike McCumber, Ming, Leo et al)
- Mechanical carbon structures
 - LBNL (Grazyna Odyneic/Eric, Walt et al)
- Mechanical integration
 - MIT, LBNL (Bob Redwine, Walt et al)
- LV/HV PS and controls
 - LBNL (Grazyna Odyneic/Leo)
- MAPS stave assembly and testing at CERN
 - MIT, LANL, CCNU and others (Gunther Roland)
- Full module assembly and test in US
 - LBNL, MIT and others (Grazyna Odyneic/Leo)
- Online software and Trigger
 - BNL, GSU, LBNL (Xiaochun He, Chris P. et al)
- Offline software - detector simulation, geometry, offline tracking
 - NMSU, FSU, LANL (Tony Frawley, Jin et al)
- Physics simulations - to make “Money Plots”
 - LBNL, LANL, U-Colorado and all (Xin Dong, Haiwang, Sanghoon et al)
- Cost and Schedule and Resources (Dave Lee, Ming et al)
- Collaboration and Org (Cesar, Ming et al)

Global Support Structures and Other Services



More follow-up discussions happened this week:

- MIT/BATES & LANL
- MIE writing
- BNL & LANL

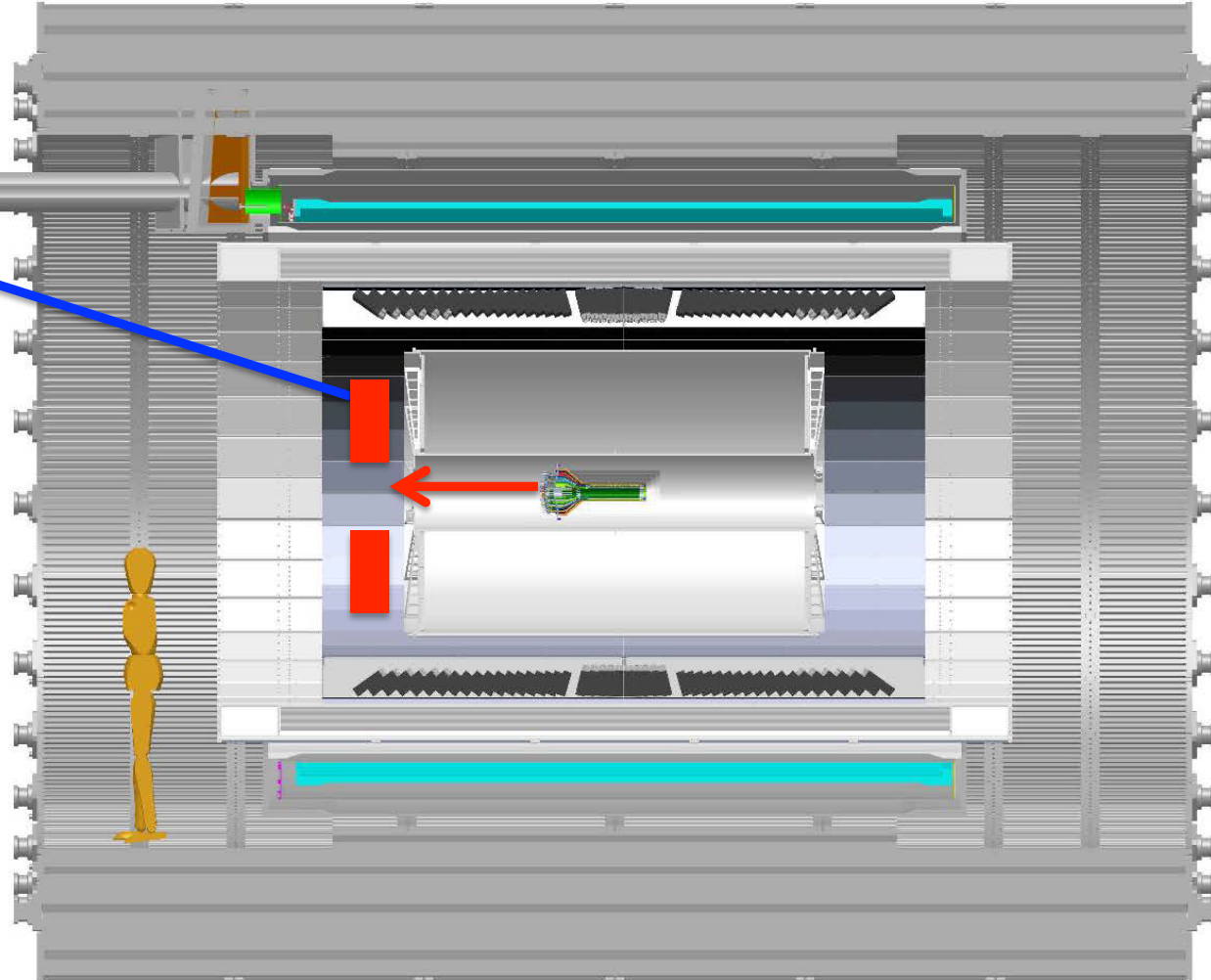
MAPS->ReadoutUnit:

- “5m” copper wires
- 6U VME modules
- 48 modules

RU->CRU@CH:

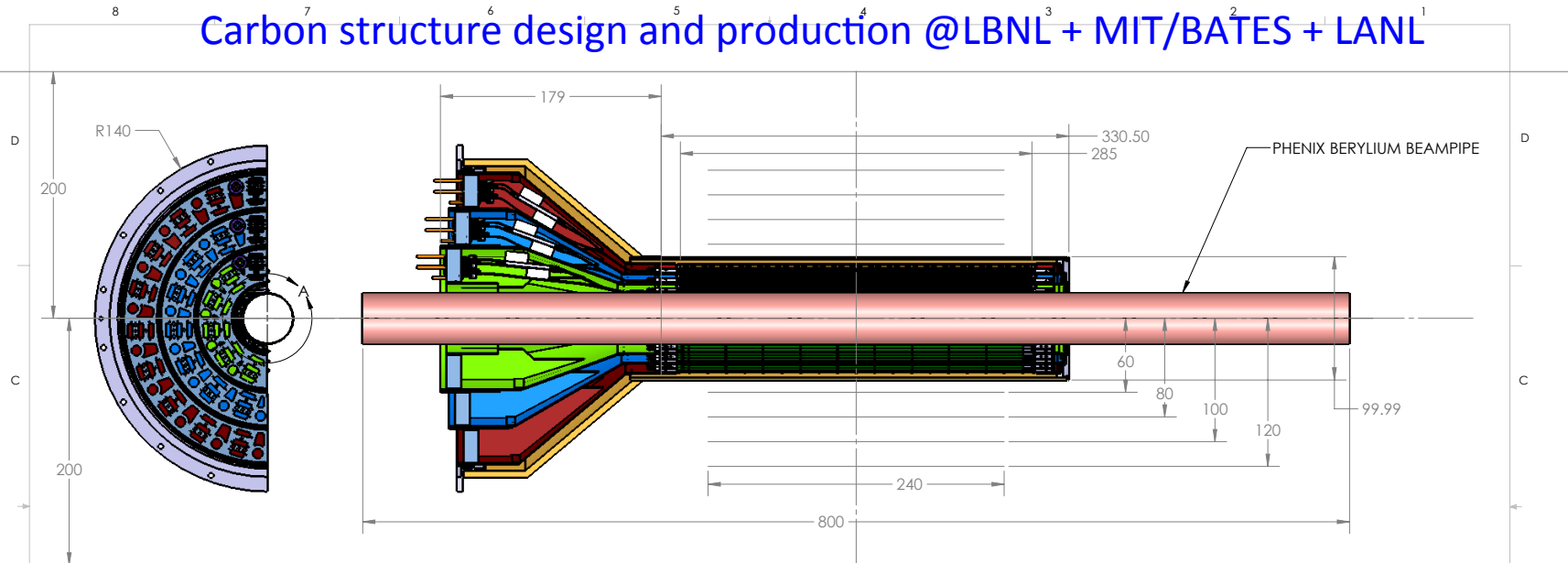
30+m fibers

Global support frame



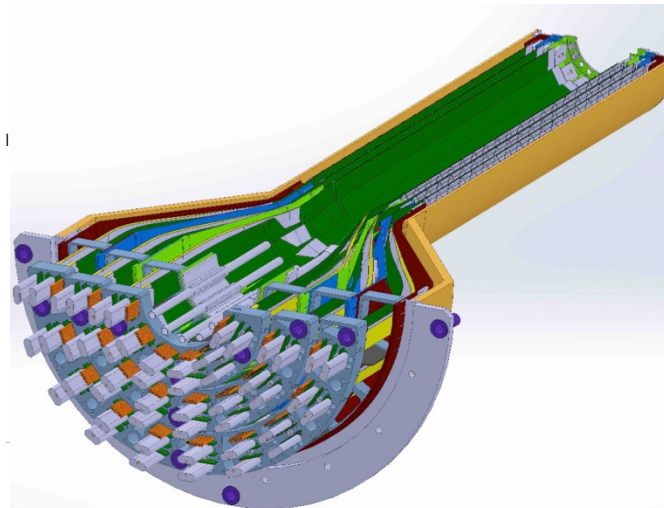
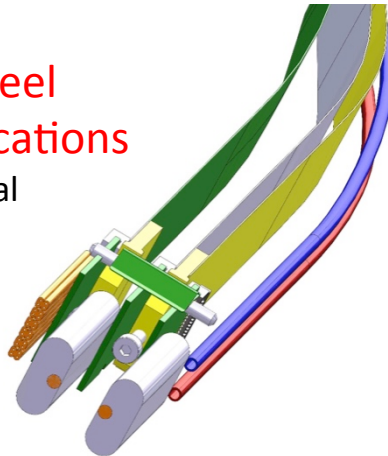
MAPS-sPHENIX Mechanical Integration

Carbon structure design and production @ LBNL + MIT/BATES + LANL



Service End Wheel Possible modifications

- High speed signal
- Analogy power
- Digital power
- Cooling



ALICE inner tracker
B-staves + end wheels + panels 210416

DWG. NO. REV.
LE: 1/3 WEIGHT: SHEET 1 OF 1

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1. Ming, Mike, Gunther et al
2. Cesar, Xin et al
3. Jin, Darren, Haiwang et al
4. Giacomo et al
5. Tony, Haiwang, Jin et al
- 6.1 Cesar, Mike, Ming,
- 6.2 Grazyna/Leo, Ming et al
- 6.3 Walt, Grazyna/Eric et al
- 6.4 Bob, Gunther, Walt
- 6.5 Grazyna/Leo et al
- 6.6 Gunther et al
- 6.7 Grazyna/Leo
- 6.8 Xiaochun, Chris et al
- 6.9 Tony, Jin, Chris et al
7. Cesar, Gunther et al
8. Dave, Ming et al

Toward the full MAPS MIE

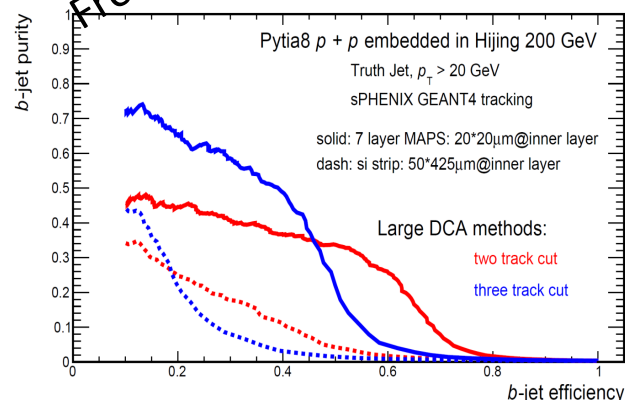
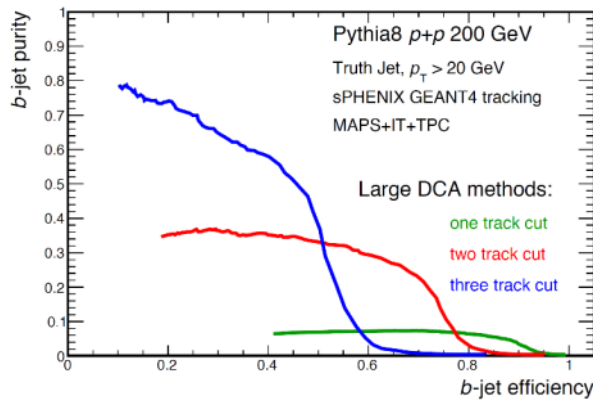
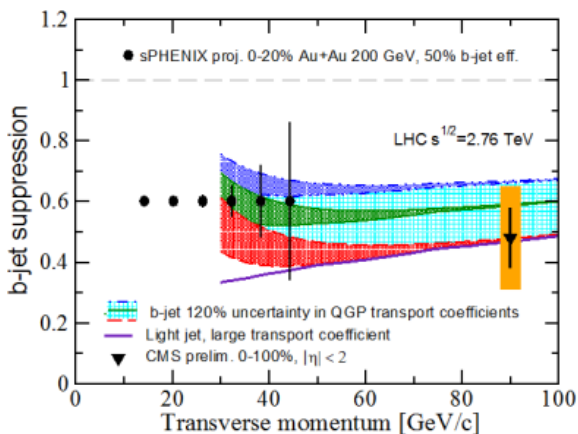
- Early communication with DOE
 - MIE pre-proposal, ~20 pages
 - Science, resources and cost & schedule
 - First full doc by the end of Jan 2017, for DOE Feb. budget meeting, LANL & LBNL
- Possible timeline of MAPS MIE
 - First complete draft, LBNL workshop Jan 24-25
 - Submitted and reviewed in FY17, establish DOE “mission need”
 - Federal budget request by DOE, Feb 2018
 - Fund available FY20 for construction (“normal route”)

Highly desired:

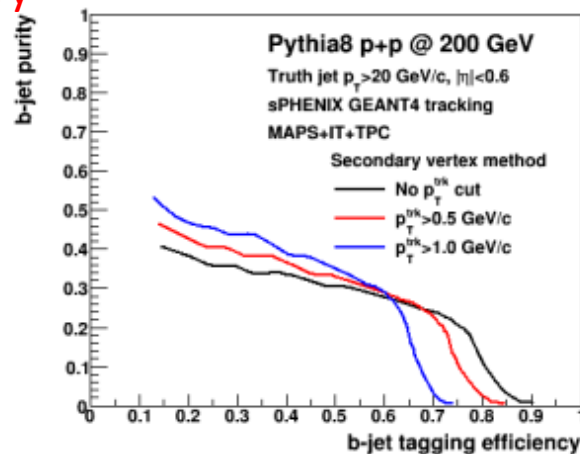
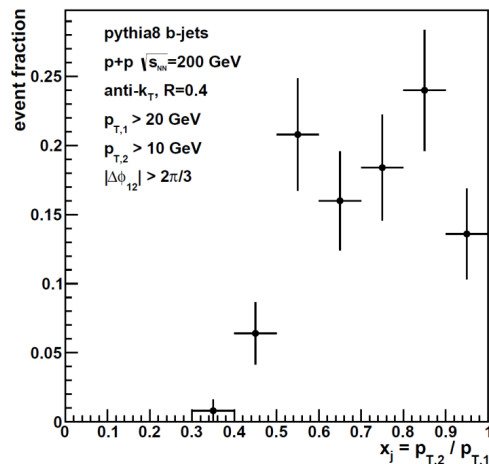
- Advanced funding by mid 2018 to produce full staves following the completion of ALICE/ITS/IB production at CERN
- Or high level “agreement” to secure CERN facility for sPHENIX

Overview for plots for MAPS pre-proposal and QM17

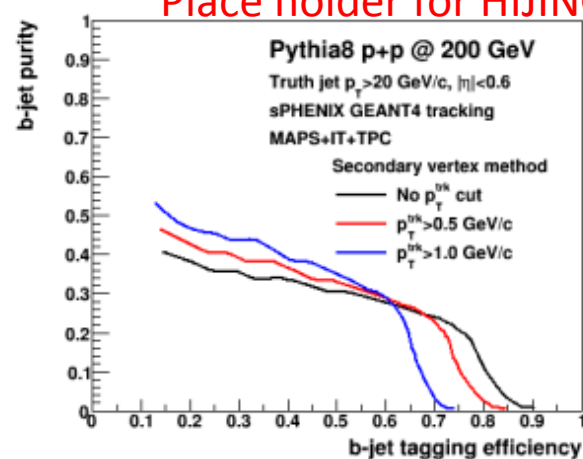
From Jin's summary slides
Preliminary: HIJING



Place holder: DiJet asymmetry



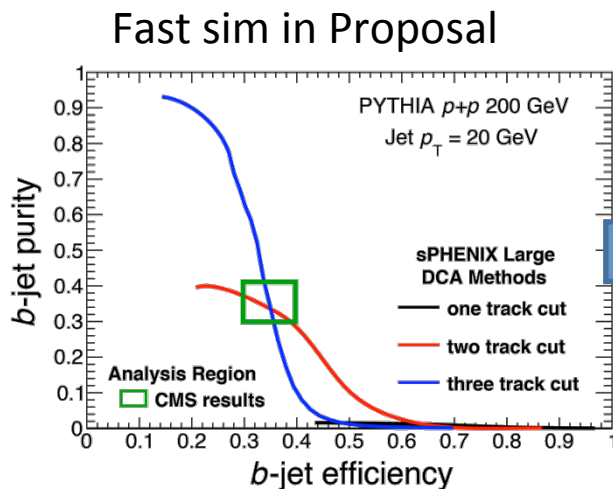
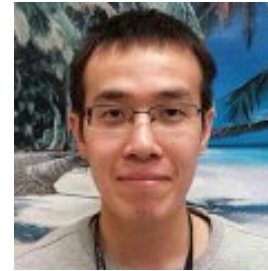
Place holder for HIJING



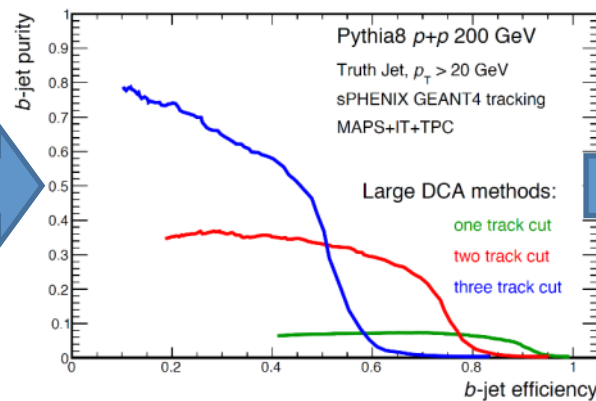
Highlight recent activities:

b-jet tagging – High DCA track counting

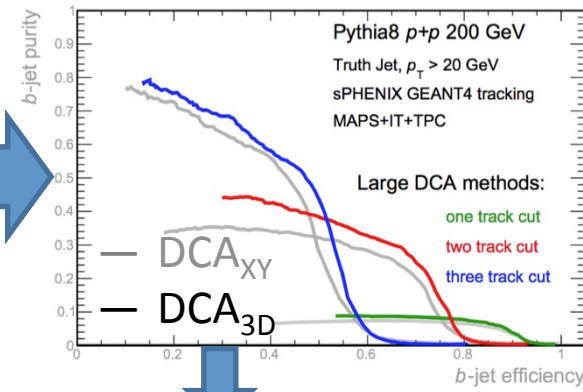
- Progress since last general meeting
 - Dennis and Haiwang implemented track counting tagger in the full Geant4 simulation
 - Haiwang produced projection plot in
- On-going past few weeks
 - Systematically validating the Geant4-based track fit procedure, in order to optimize 3-D DCA and likelihood
- Next
 - Reevaluate in HI background with HIJING embedding
 - Optimizing cuts to suppress fake off-vertex tracks



Full Geant4 Sim in G4 (DCA_{XY})



Exploring 3-D DCA in G4 NOT optimal tune yet!



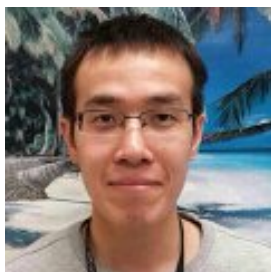
From Haiwang's talk

<https://indico.bnl.gov/conferenceDisplay.py?confId=1926>

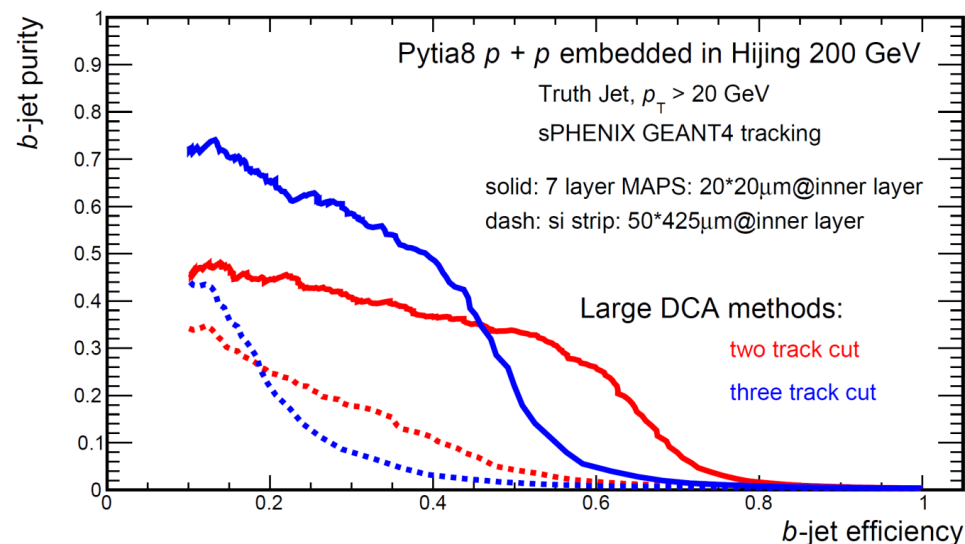
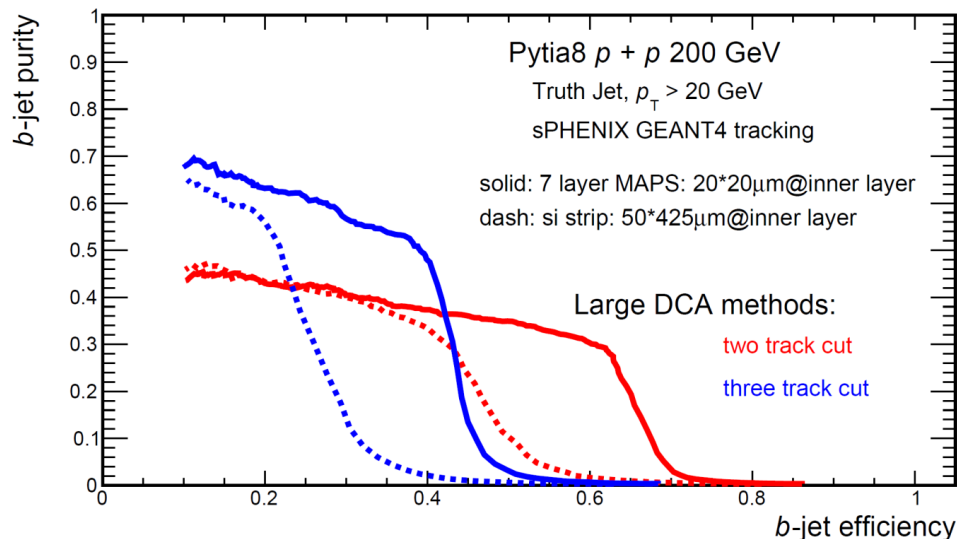
b-tagging performance in HI
Detector choice justifications

New plots from track counting

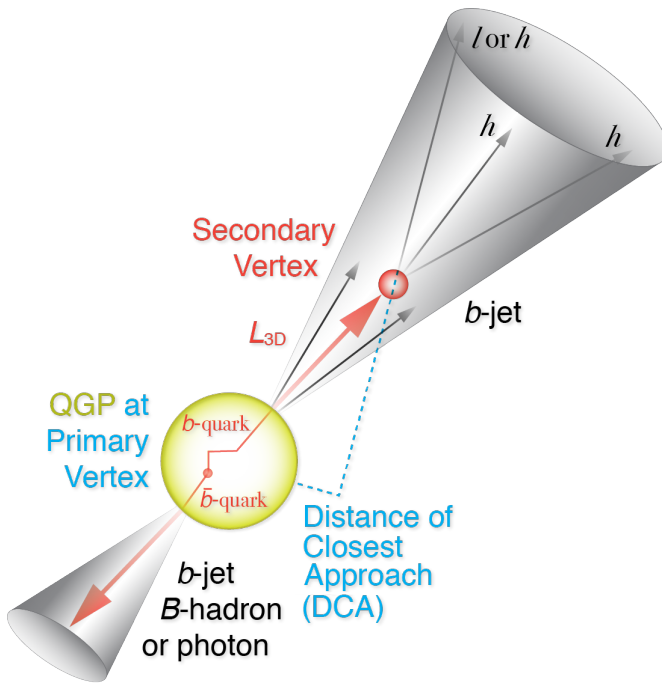
- Answering two main questions in this workfest:
 1. How we do in HIJING
 2. What if we use other technology



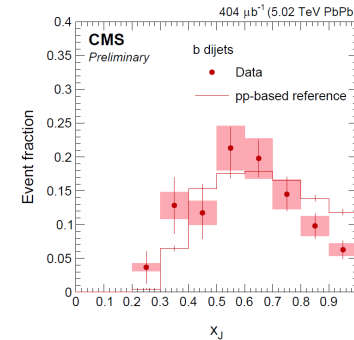
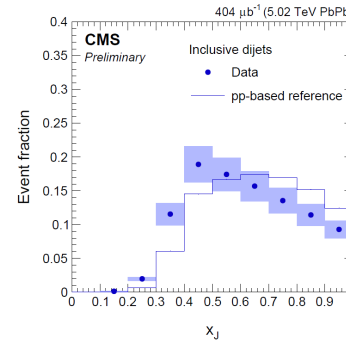
**Impact of MAPS vs other option
on DCA and b-tagging**



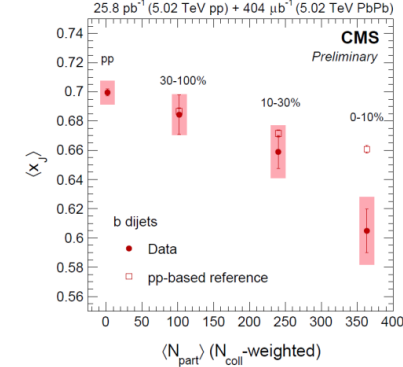
New plots from Di-b-jet asymmetry



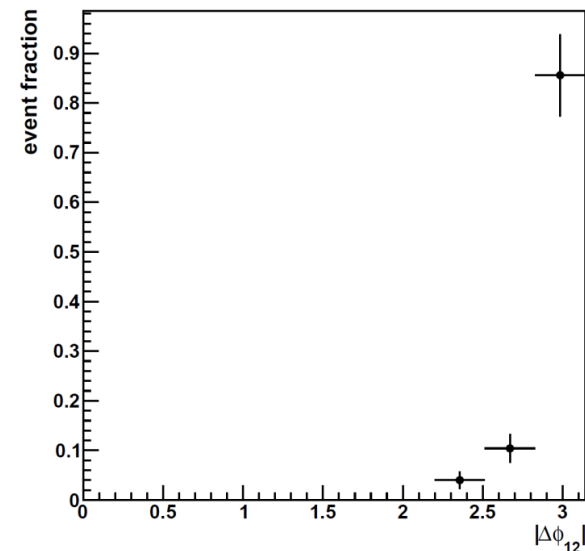
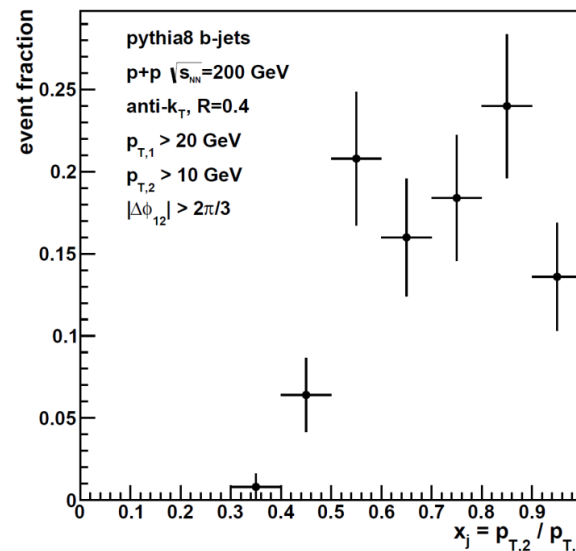
1/12/17



CMS PAS HIN-16-005

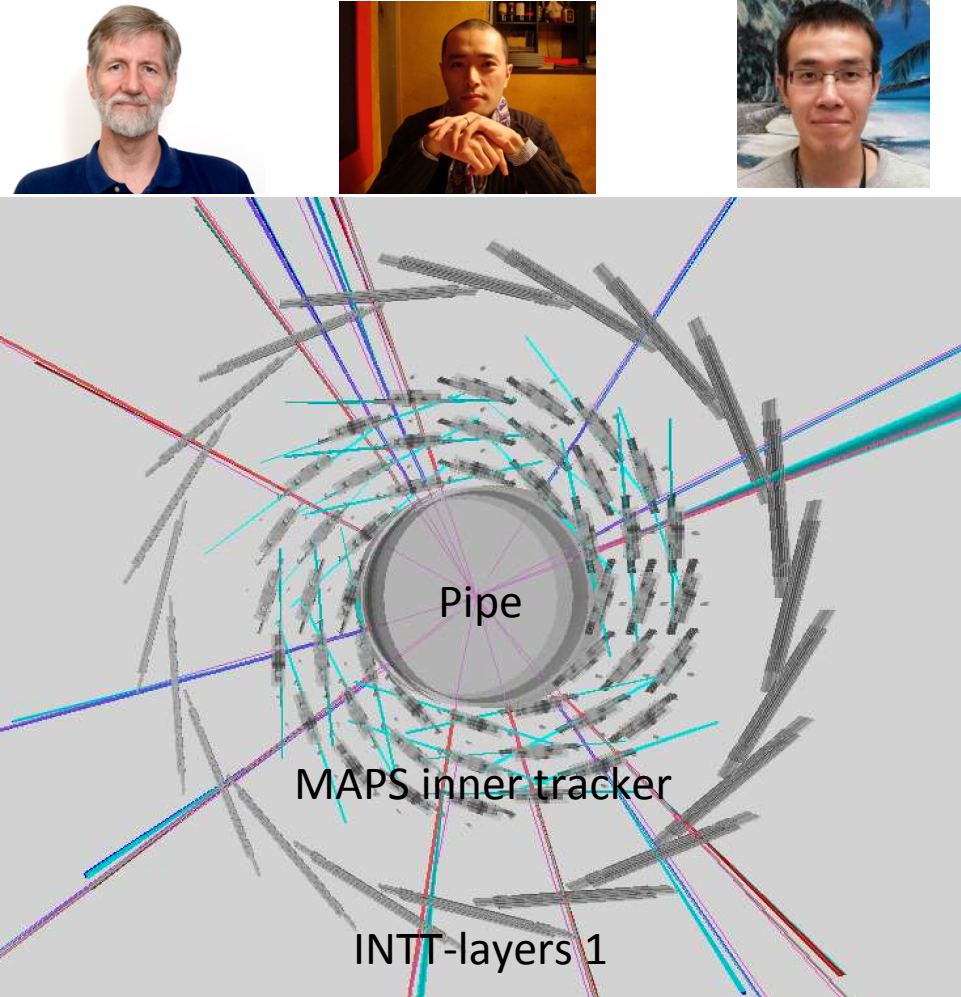


Started in workfest : sPHENIX di-bjet asymmetry,
This plot is preview: fast-sim, hardQCD-B, NOT scaled to lumi
- Darren McGlinchey (UCB)



Silicon ladder setup

- Implementing realist geometry in laddered silicon detectors
- Base-code in nightly build
- Tuning on going for
 - INTT ladder thickness
 - Kalman filter to interface with geometry



Summary on High priority development tasks

- Realistic implementation in Geant4
 - Made major progress by Tony and Haiwang
 - Near term goal – fix INTT thickness and merge for general user – Tony, Gaku, Haiwang
- Pile up simulation
 - Mike McCumber developed framework and init tests.
 - Near term goal – complete development for general user – Mike + Gaku?
- Generalized Kalman filter
 - Haiwang Y./Chris P., Improved with ladder geometry
- Multi-vertexing/ b -tagging via secondary vertexing in jet
 - Sanghoon L./Haiwang Y.: improve fitting utility,
 - Near term goal - HI analysis – Sanghoon
- b -jet tagging: Track Counting
 - Haiwang Y./Dennis P.: produced first HIJING performance plot with 7-layer MAPS VS Silicon
 - Near term goal – Certify MAPS+IT+TPC plot for HIJING embedding performance – Haiwang
- b -jet tagging: Soft Lepton Tagging, exploratory
- b -quark jet selection: di- b jet asymmetry
 - Darren volunteered to lead the work
 - Near term goal – certify plot for proposal and QM17 – Darren
 - Also Xuan Li (LANL) started look at B-meson- b -jet asymmetry