Summary of MDI and MDI-BDS joint sessions

17 talks and 1 discussion

T. Tauchi, 9th ACFA LC workshop, BILCW07
7 February 2007, Beijing

MDI issues at this workshop

I. Beam Parameters

Center-of-mass energy and luminosity : F. Richard

nominal, lowQ, lowP, largeY,(high lum.) - collimation depth

: F. Jackson

II. RDR/DCR configuration

7x2 (14)mrad, L*=3.5m, 1 BDS, 2 detectors with push-pull

GLD : H. Fujishima

SiD : T. Markiewicz

LDC : K. Buesser

4th : A. Mikhailichenko

MDI in DCR : T. Behnke

(1) Background

Pairs in TPC, VTX and forward calorimeters : GLD, LDC
- Track finding efficiency in GLD-VTX : T. Nagamine
- LumiCAL,BeamCAL and GamCAL : W. Lohmann

Muons and synchrotron radiation
- Collimation depth (L*, beam pipes) : F. Jakson

(2) IR design and optimization

L* = 4.5, 3.5, 4.05 and > 3m, respectively
Rin@FCAL and anti-DID : GLD
lowZ mask : LDC
Beam pipe configuration : GLD, SiD, LCD, 4th

(3) Surface assembly - 2 year saving

SiD in movie, LDC and 4th

(4) Push pull scheme

SiD, LDC, 4th

Push pill in RDR : A.Seryi

Proposal of "single plat form" for 2 detectors : H. Yamamoto

Detector & FD support and stabilization : SiD, 4th

(5) Instrumentation

Laserwire measurement precision : G. Blair

Fast beam feedback system (FONT) : P. Burrows

Pair backgrounds at the feedback BPM : T. Hartin

Test beam facilities (workshop report) : W.Lohmann

III. Permanent magnet option at ILC

Final qudrupole and tail folding octupole : Y. Iwashita

IV. MDI at BEPCII

IR design and construction : C. H. Yu
SC final focus quadrupole : F. S. Chen

V. Discussion

MDI panel activities ; busy for CCRs
- need the panel initiative
- need frequent communication with GDE/EC

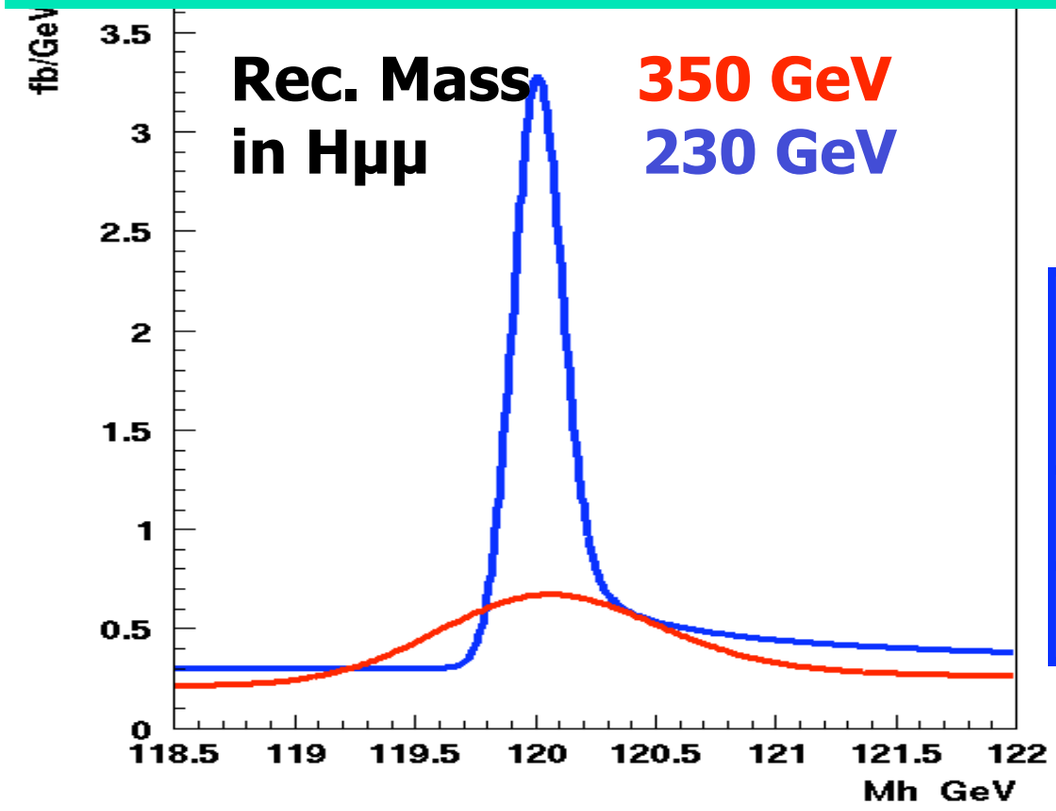
Push pull task force
- should continue for the engineering studies

Also, discussions on EDR work-packages at the GDE-BDS session.

Highlights

How to optimize the ILC energy for measuring ZH

Philip Bambade, François Richard (LAL/Orsay)



Needle plot for mass determination

ECM GeV	σ(Hμμ) fb	Pμ GeV	σMh MeV	ℒ(30 MeV) fb-1 μμ+ee
350	4.6	83	900	780
230	9.1	54	200	20

Invisible decays

E_{cm} GeV	$\sigma(HZ_{had})$ fb (34% eff)	$\sigma(Z_{had}Z_{inv})$ Fb $\pm 2\sigma_{Mh}$	σ_{Mh} GeV Hadrons	$\mathcal{L}$ fb^{-1} 95% CL $BR_{inv}<2\%$	$\mathcal{L}$ fb^{-1} measure $BR_{inv}=2\pm0.5\%$
350	30	10	7.3 (1C fit)	85	500
230	60	4	2.3 (1C fit)	8	50

If M_h=120 GeV, there are many good reasons to run at ~230 GeV:

- Machine limitation (luminosity, e+ source etc.) ? @$E_{cm}=M_h+110$GeV

Very Forward Instrumentation of the ILC Detector

Wolfgang Lohmann

'Old' Kernel

FCAL Collaboration
High precision design

New Members

Univ. of Colorado, Boulder,
AGH Univ., INP & Jagiell. Univ. Cracow,
JINR, Dubna,
NCPHEP, Minsk,
FZU, Prague,
IHEP, Protvino,
TAU, Tel Aviv,
DESY, Zeuthen

Vinča Institute of Nuclear Sciences, Belgrade
Royal Holloway, London,
BNL, Brookhaven, NY,
LAL, Orsay
Yale Univ.

No Asian participation at present !

Goal-Design and R&D for:

- BeamCal
- GamCal
- LumiCal

Luminosity measurement

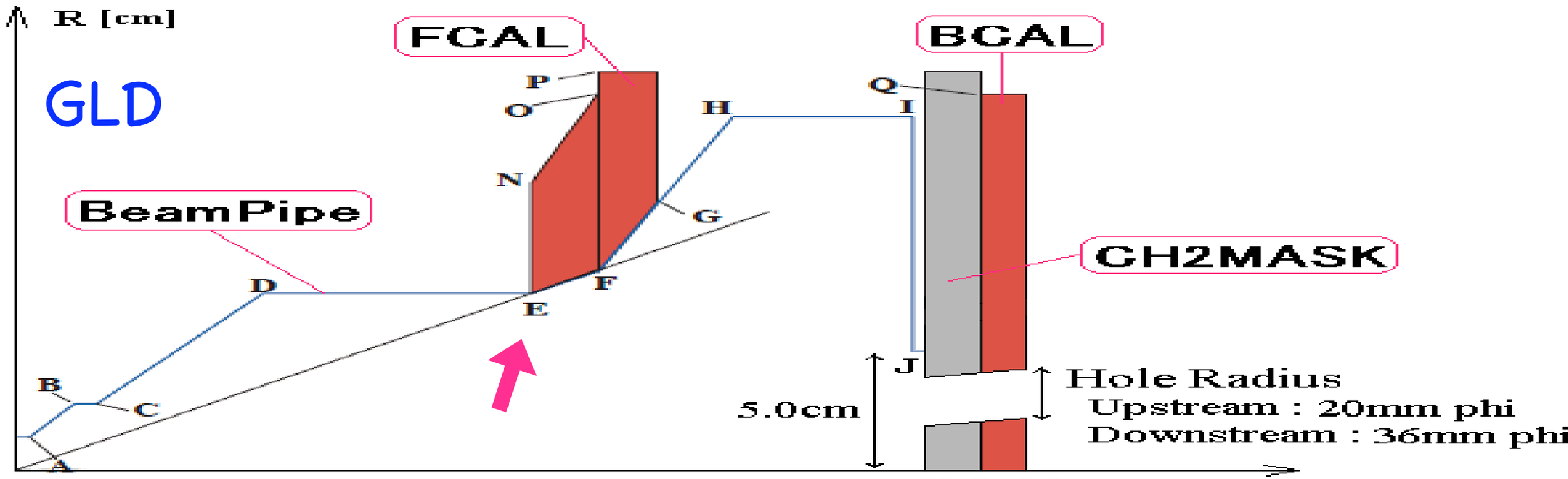
Goal: Precision ~10^{-4}

Inner Radius of Cal.:	< 4 μm
Distance between Cals.:	< 60 μm
Radial beam position:	< 0.7 mm

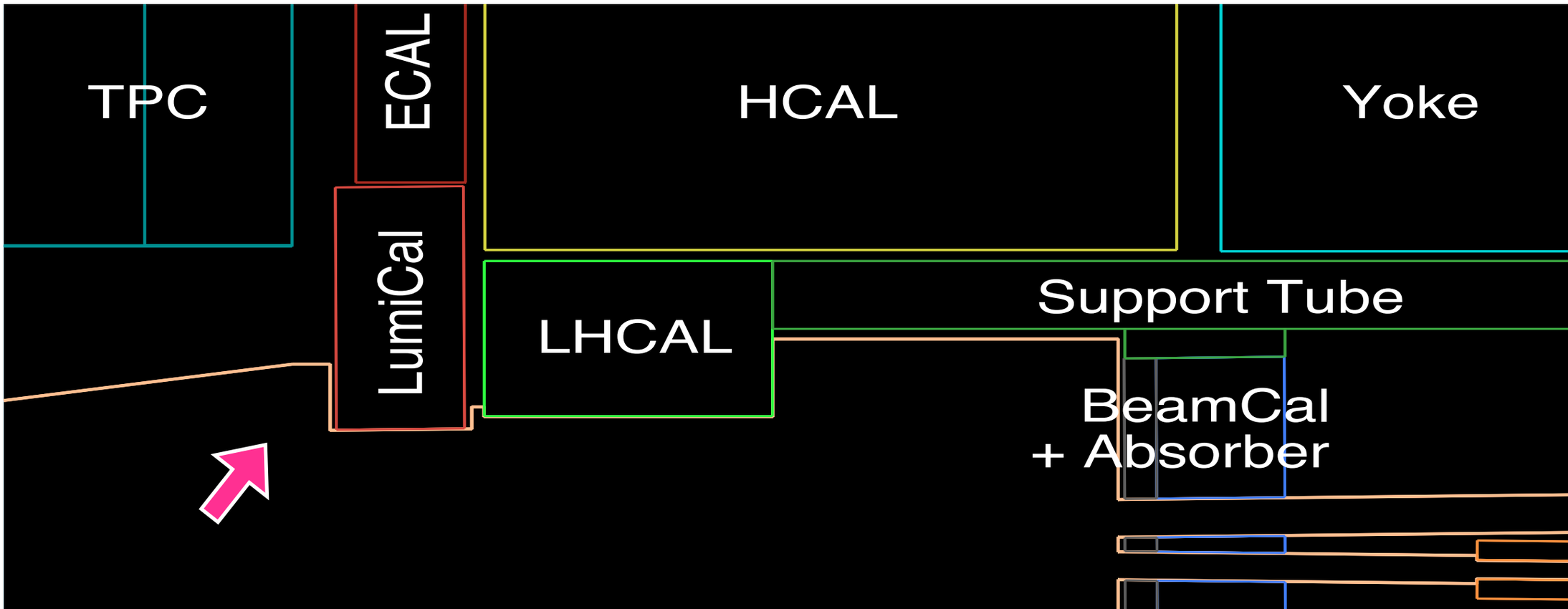
see: PRC R&D 01/02 (2002)

Beam pipe at FCAL/LumiCAL

GLD



LDC

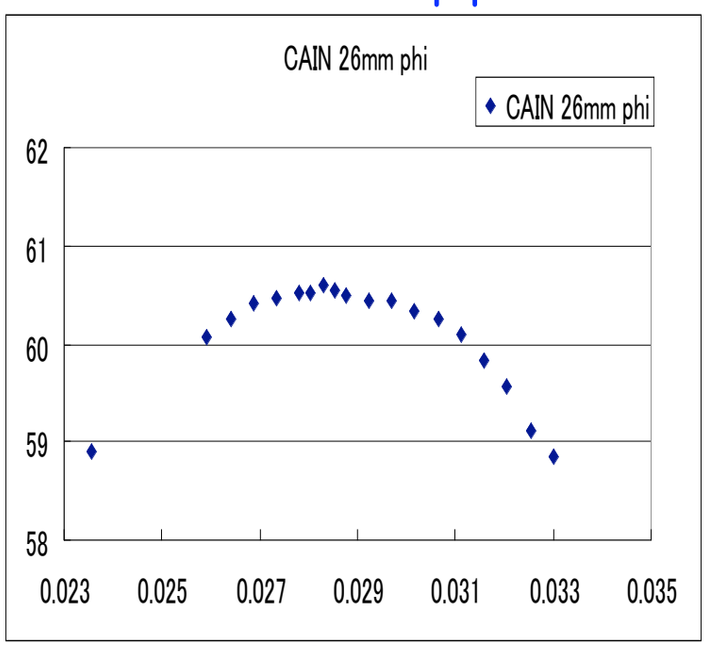


GLD IR optimization and background study

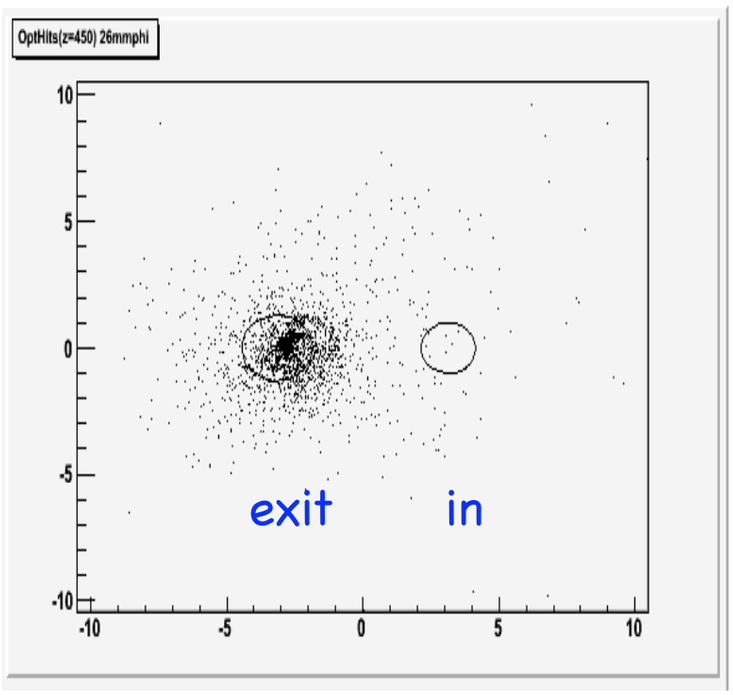
H.Fujishima

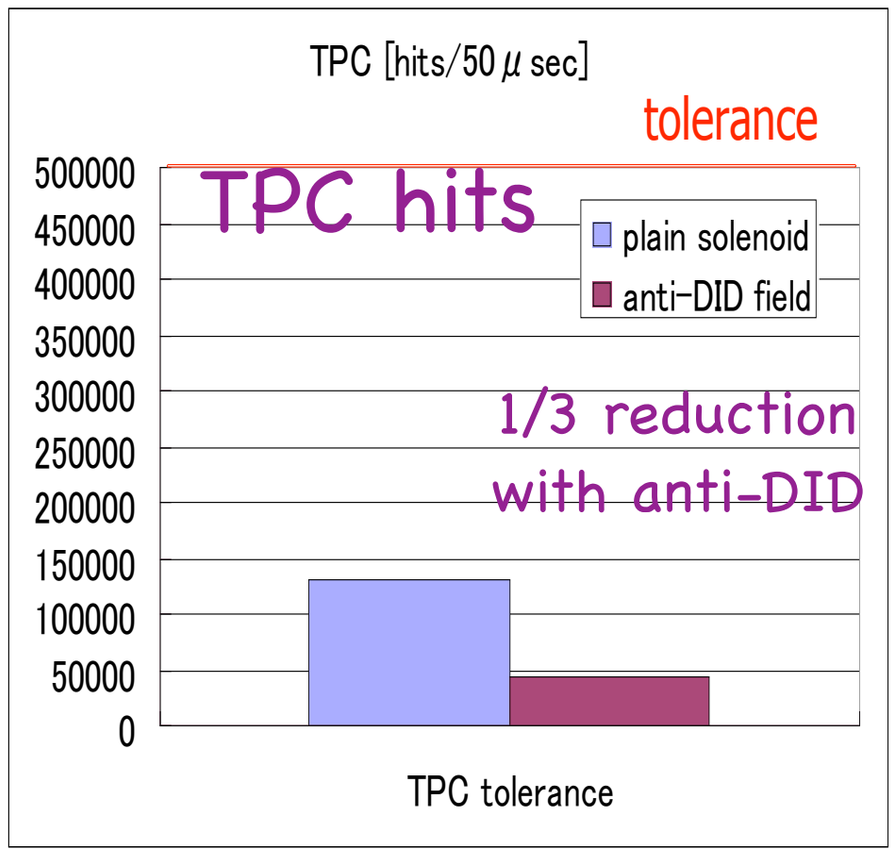
(1) anti-DID

Fraction of particles through the ext. beam pipe

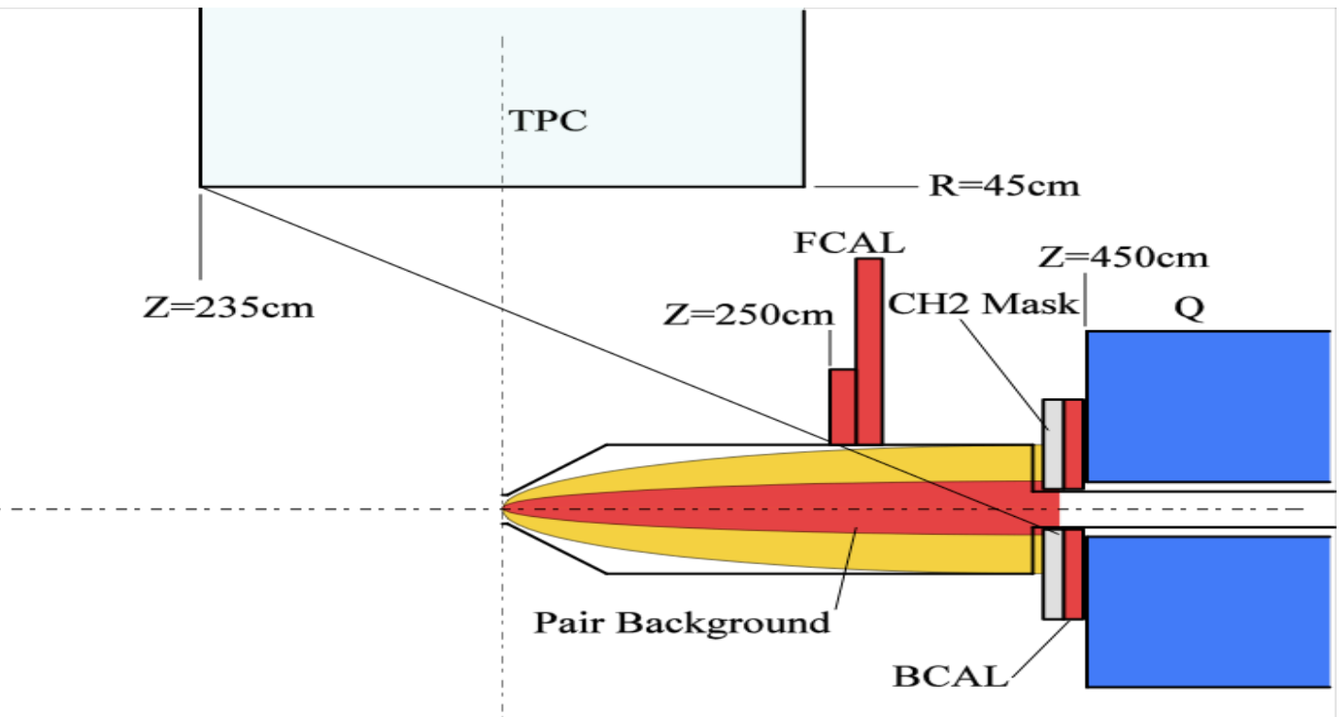


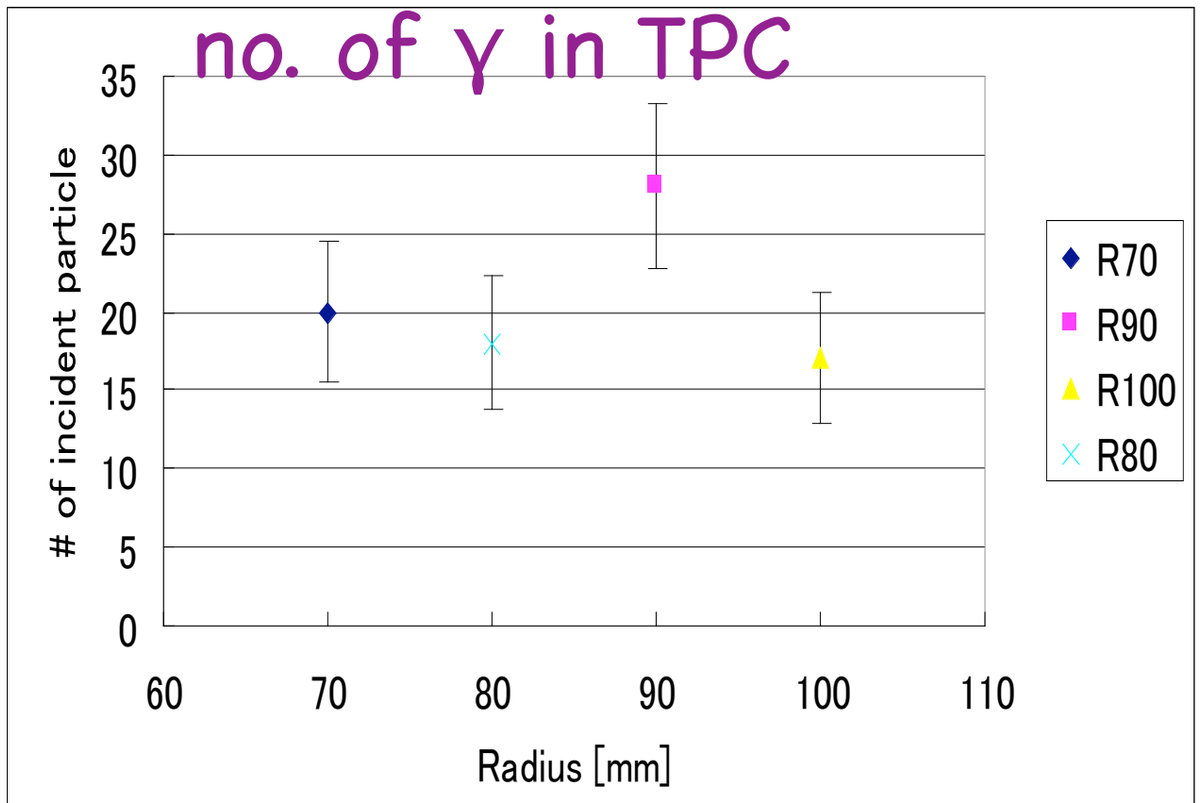
B_{anti}^{max}





(2) inner radius of FCAL

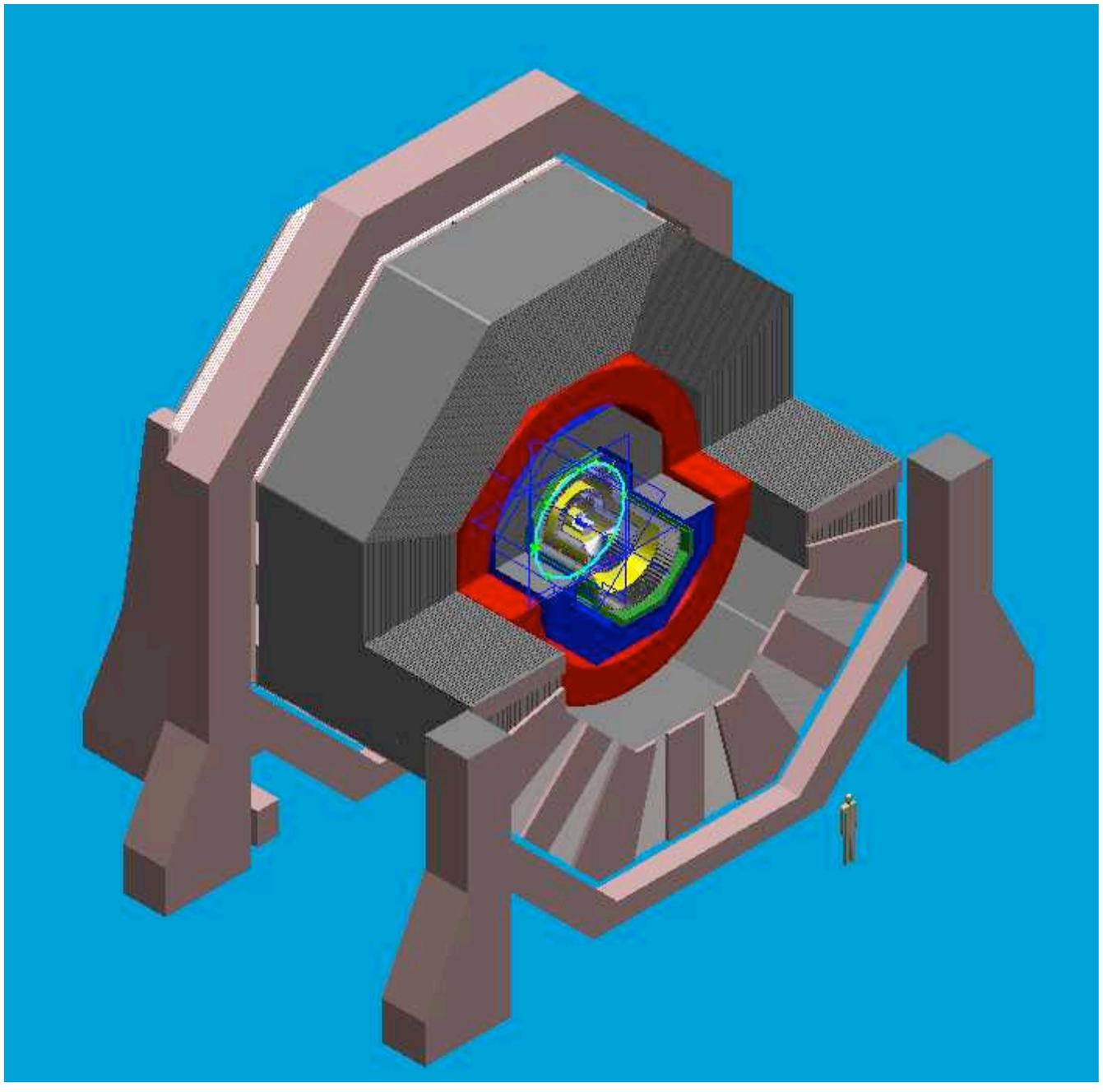




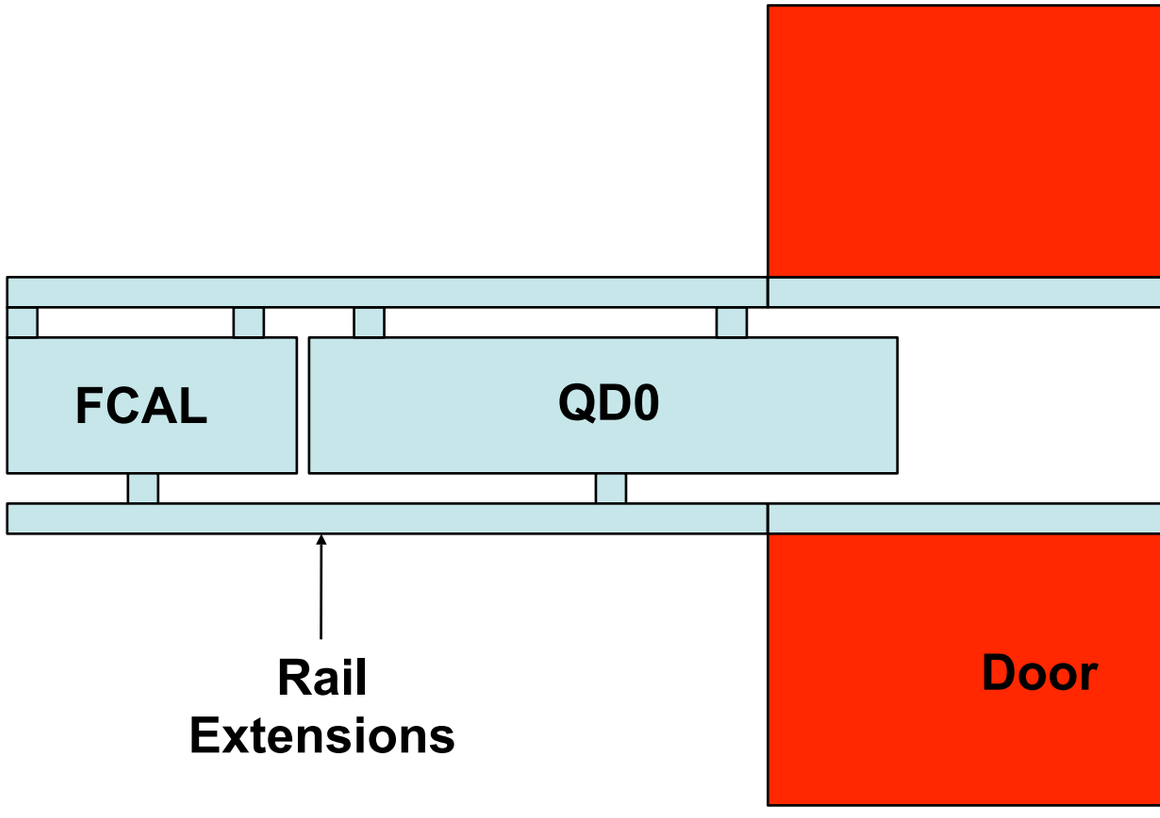
SiD MDI Issues

Tom Markiewicz

SiD Assembly Movie

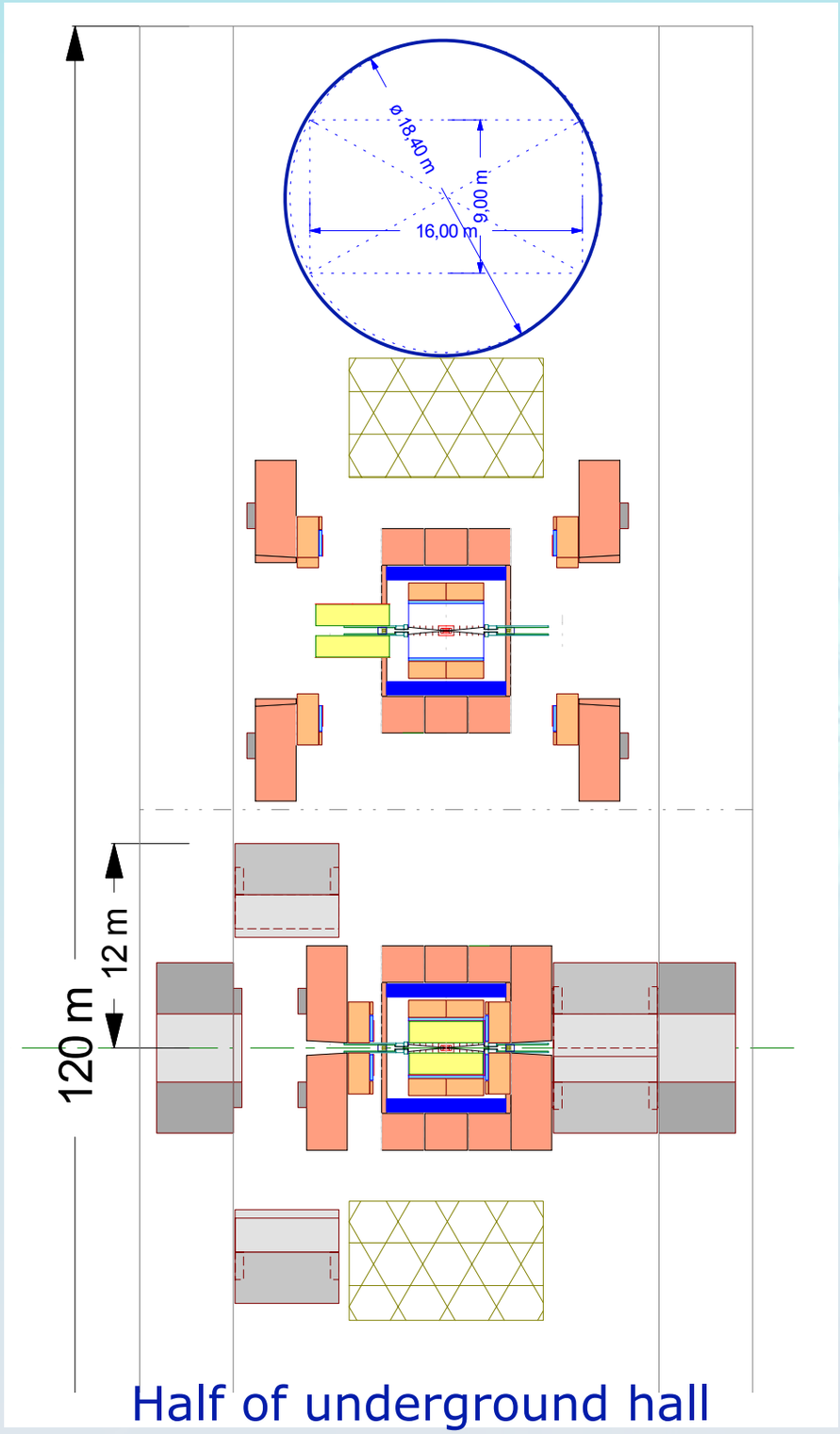


FCAL/QD0 Supported with Door Open



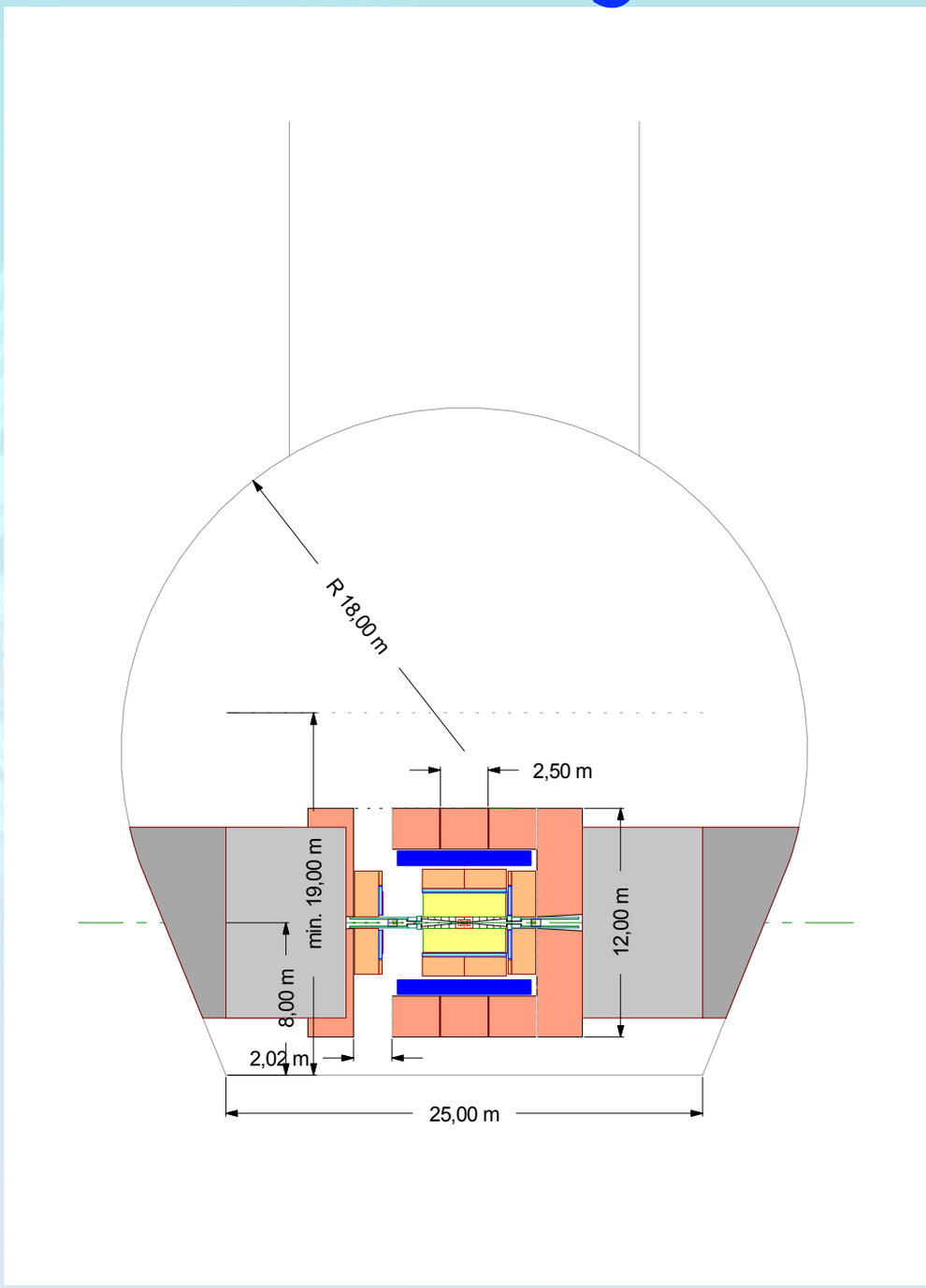
Drop idea of cantilevered support tube

LDC in Underground Hall



Half of underground hall

surface assembling as CMS

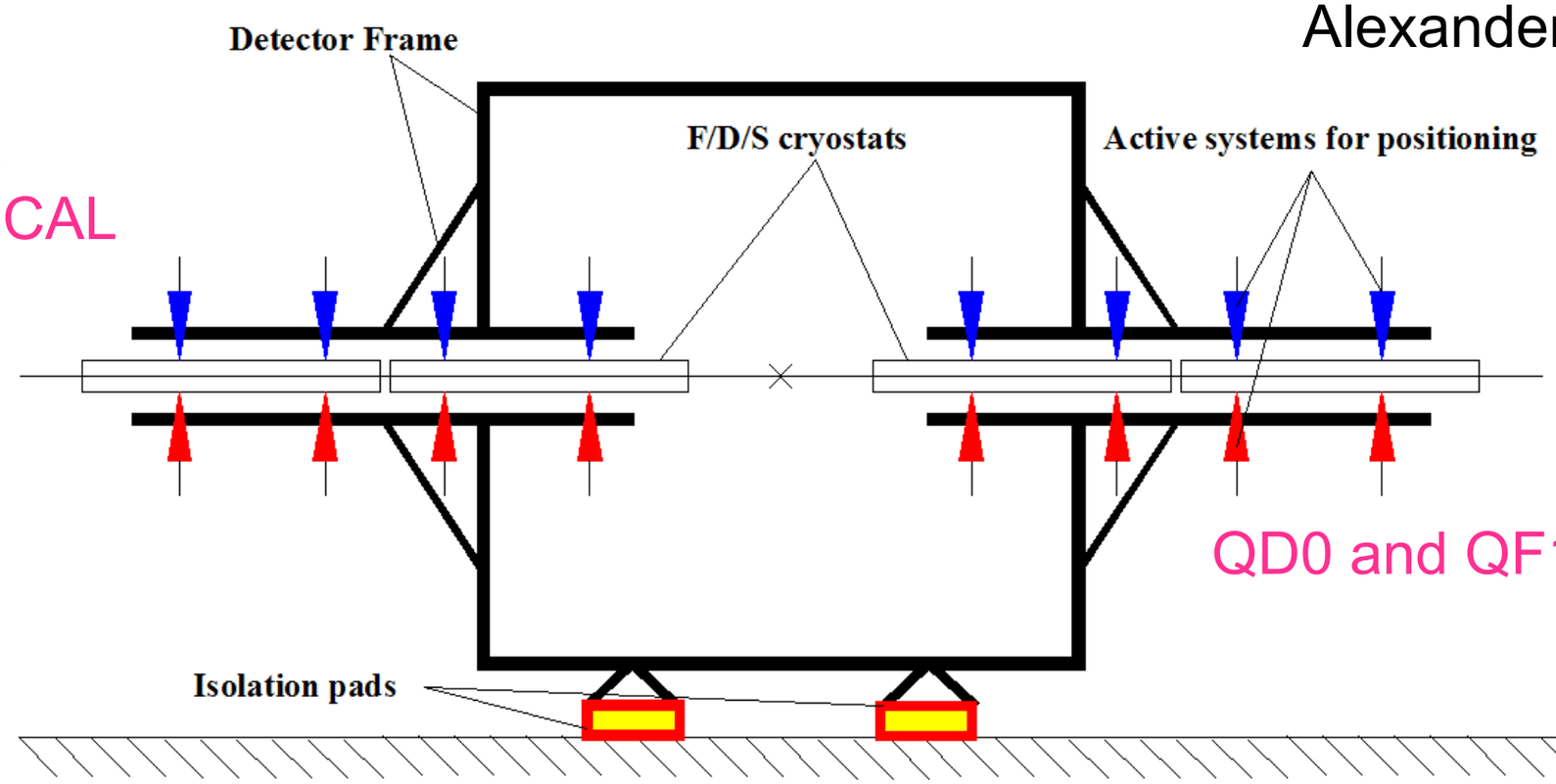


Surface hall size : 50m (later 70m) x 30m;
2 x 80t crane; hook 19m above floor.

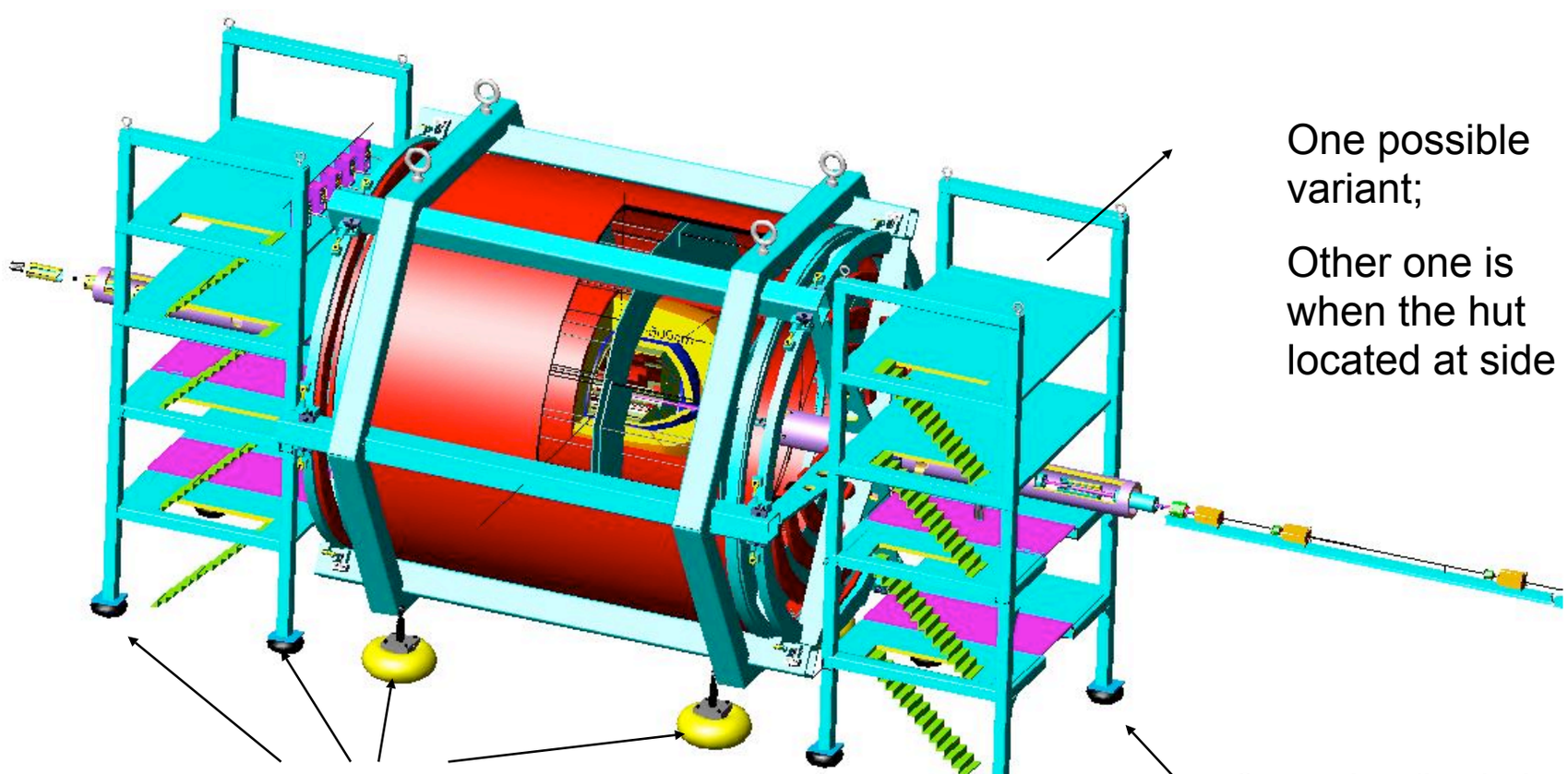
4-th Concept MDI issues and IP Design

Alexander Mikhailichenko

no iron
dual SC coils
dual readout CAL



QD0 and QF1 together



One possible variant;

Other one is when the hut located at side

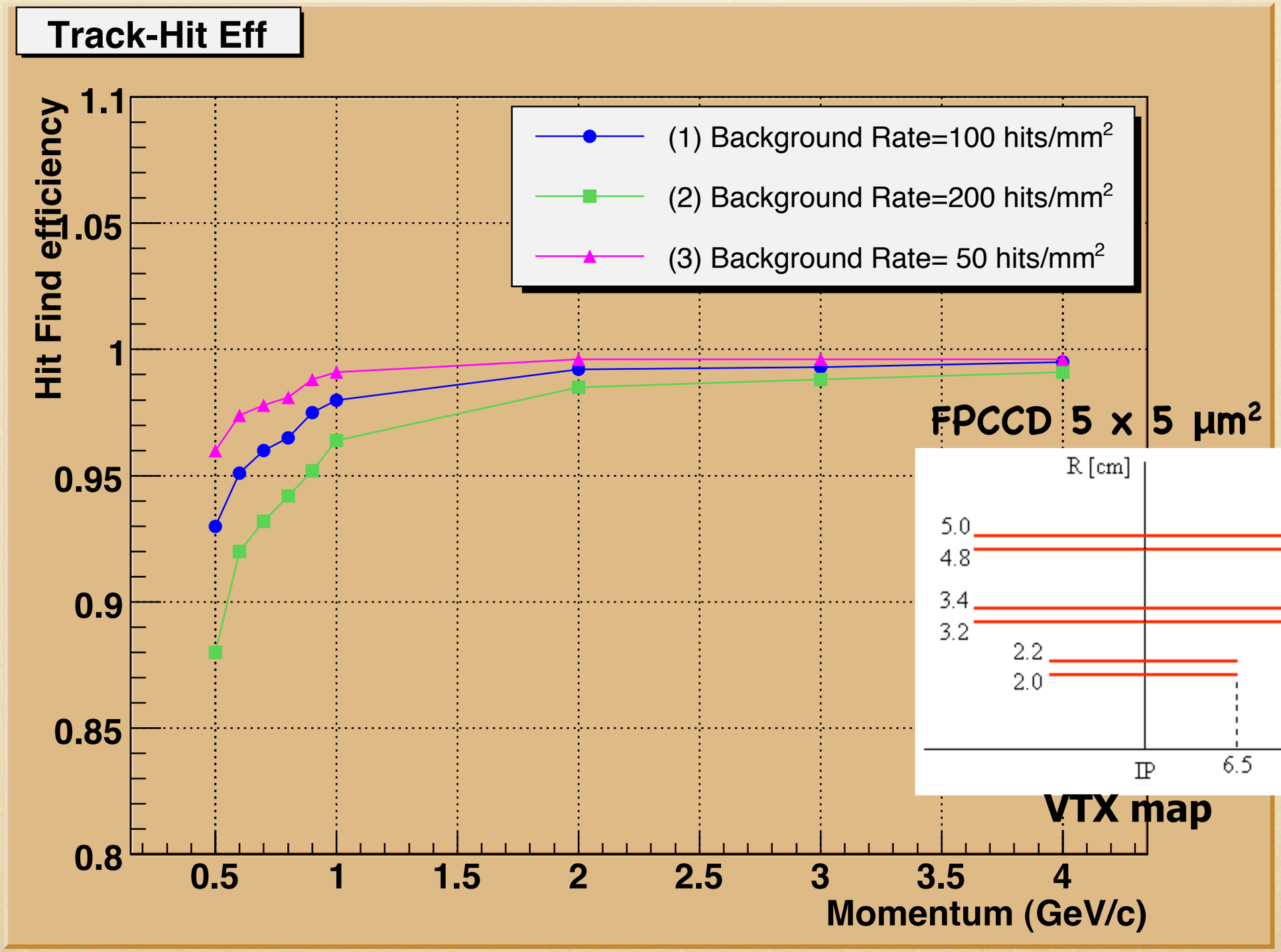
Air pads can be used here

Console (hut) has anti-vibration footers.

Background in GLD-VTX

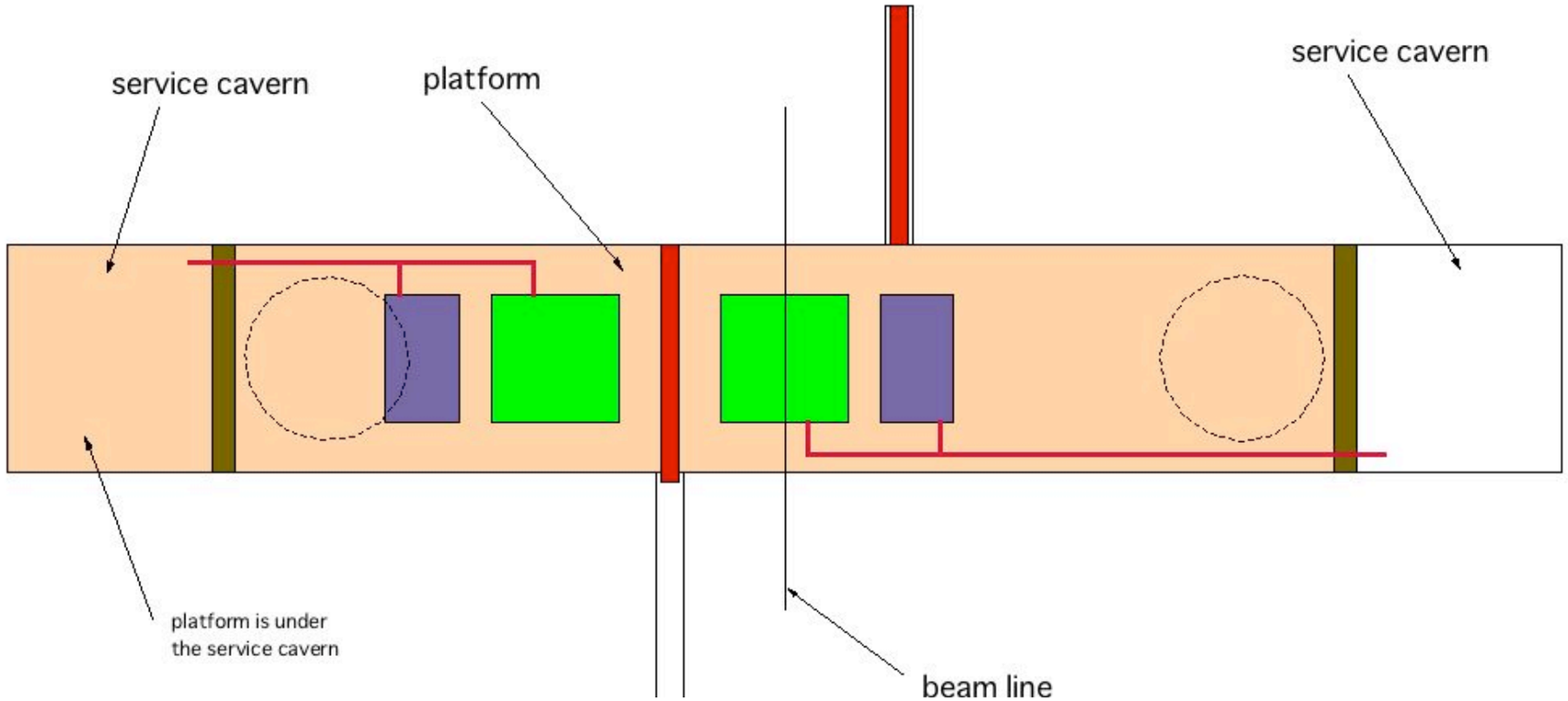
T,Nagamine

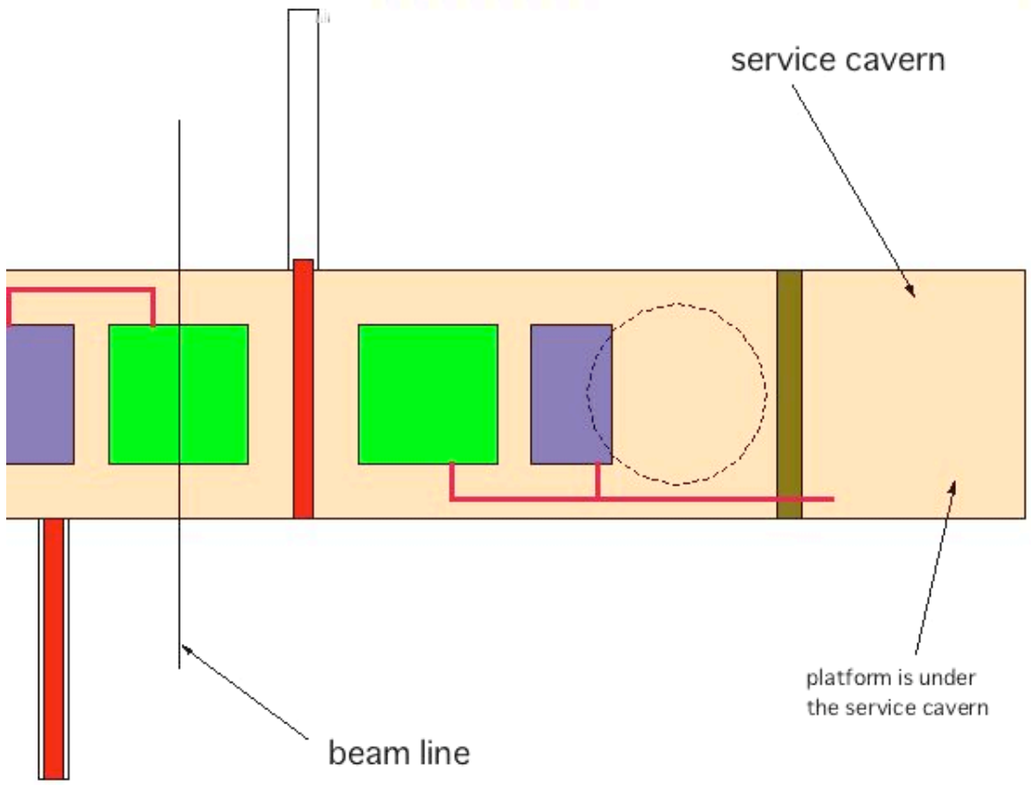
Efficiencies for different hit rates

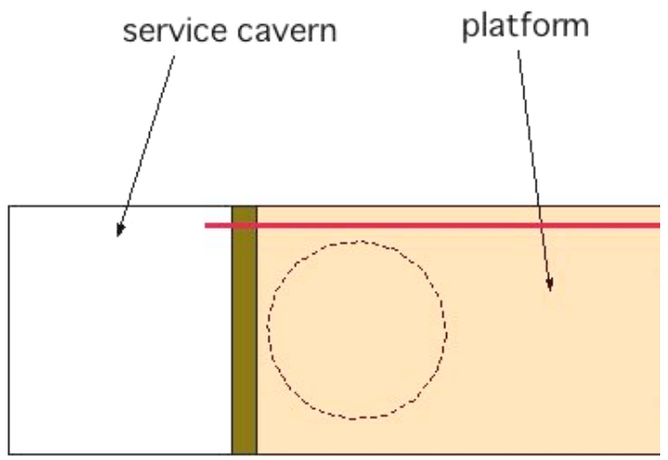


Push-pull with a “single” platform

H.Yamamoto



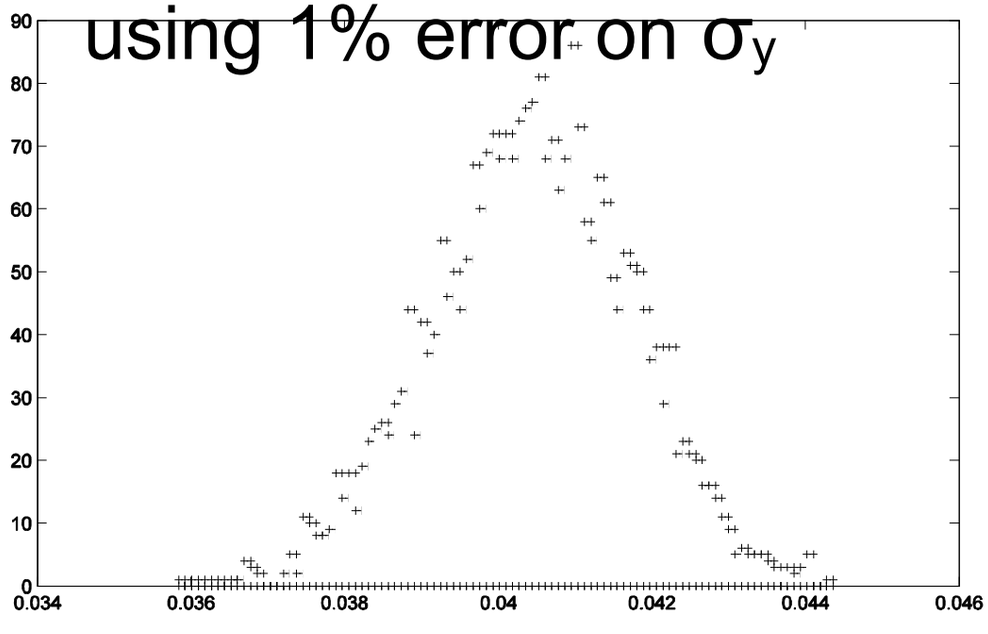




Laser-wire Measurement Precision

Grahame Blair

Reconstructed emittance of <u>one train</u> using 1% error on σ_y



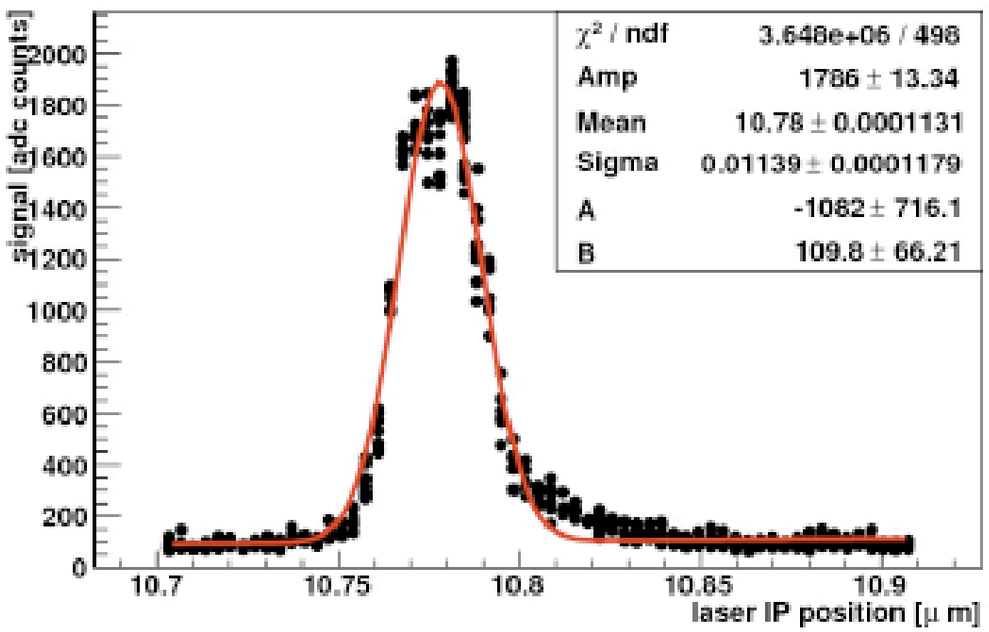
LW Goal at ILC

Conclude: Essential to measure the spot-size at the few % level or better : $\sigma_y \sim$ 1um

I. Agapov, M. Woodley

Results at ATF Extraction line, Nov. - Dec. 2006

- Wire scanner measurements to confirm optics
  - Electron beam size ~4μm
- Laser scans
  - Laser-electron beam quadrature size ~11.4μm

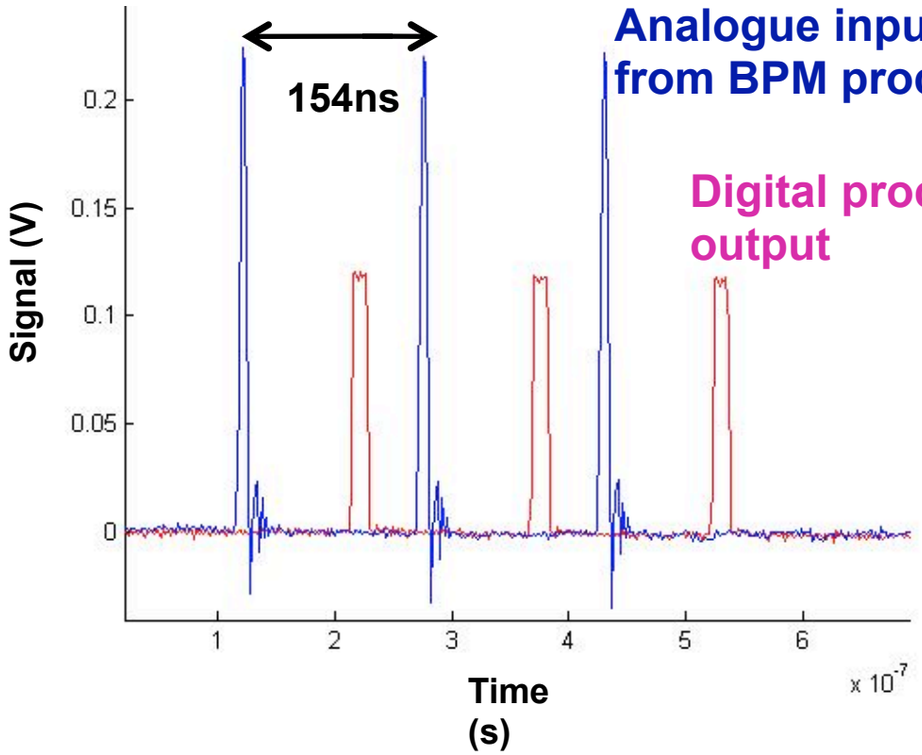


S. Boogert, L. Deacon

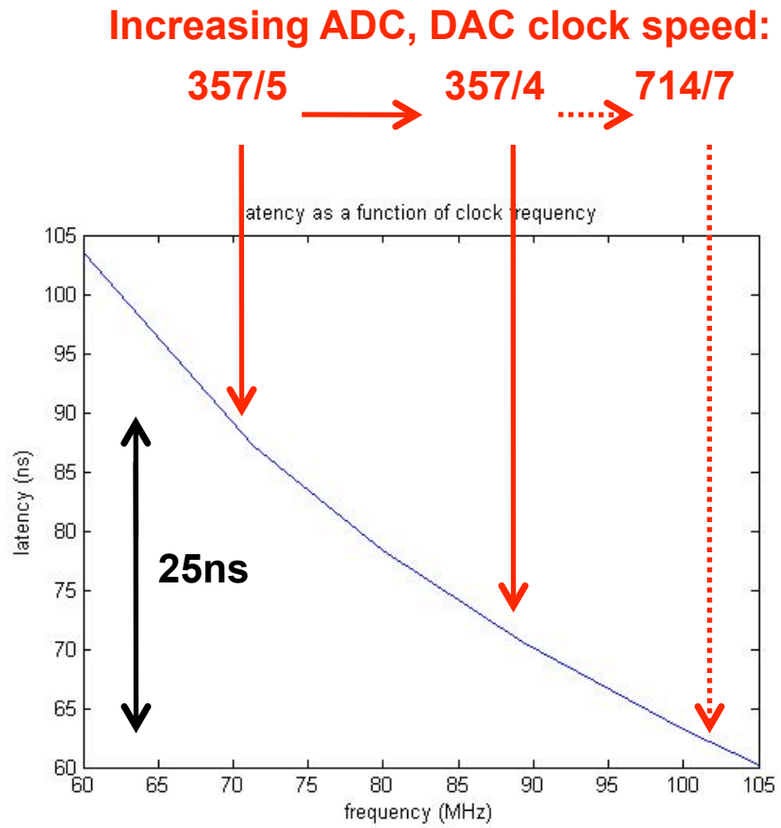
Status of fast beam feedback systems

Philip Burrows

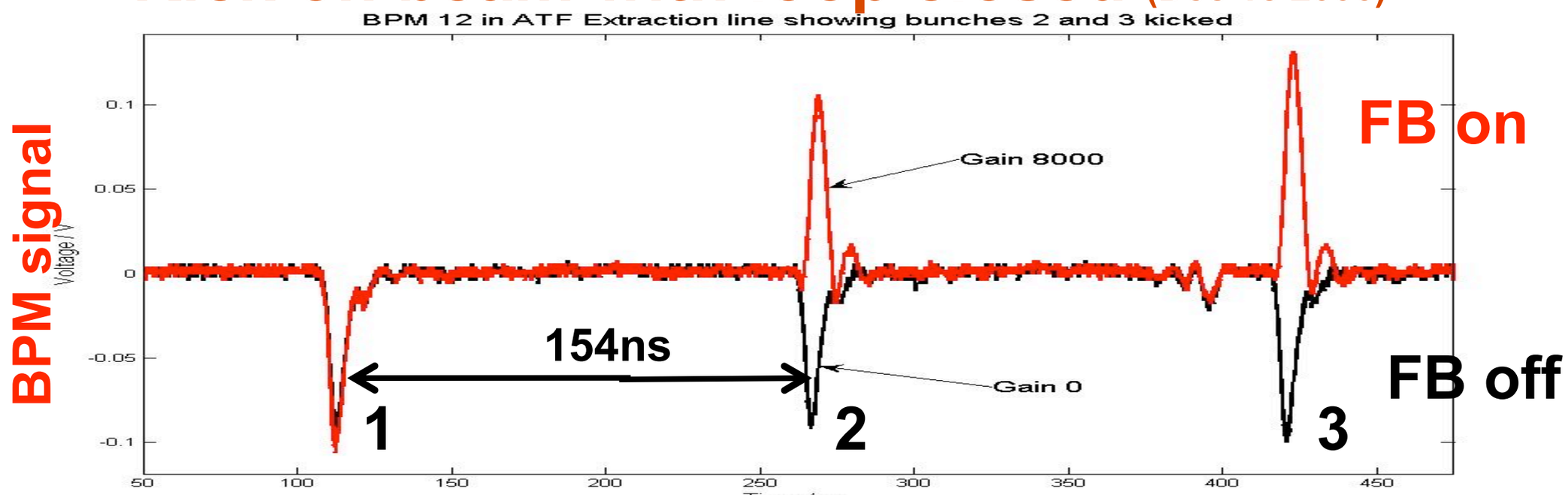
Beam test results at ATF (April – November 2006)



FONT4 digital feedback

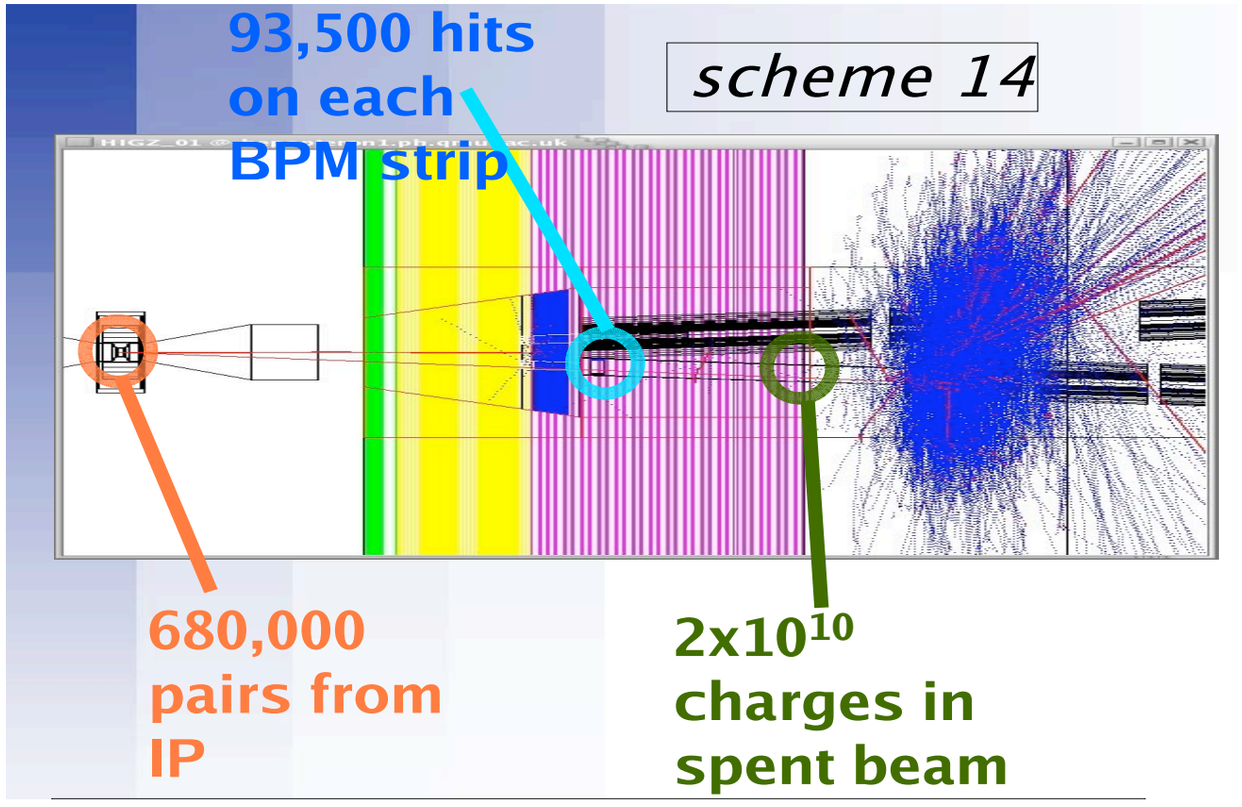


Kick on beam with loop closed (Dec 15 2006)

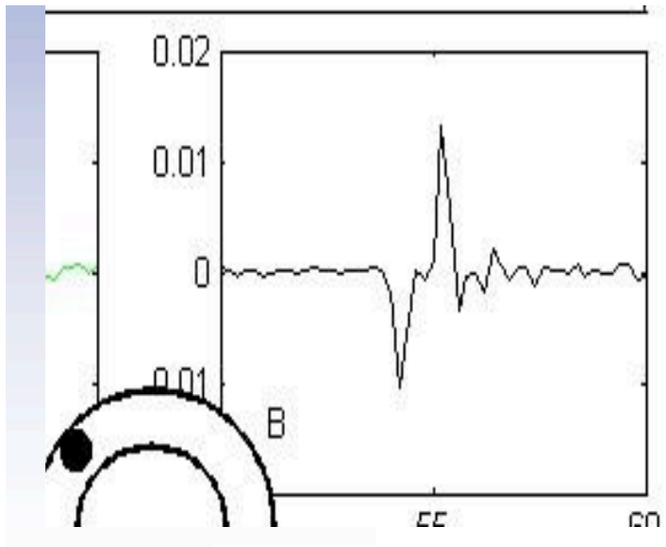


Pair backgrounds at the feedback BPM – ESA tests and simulations

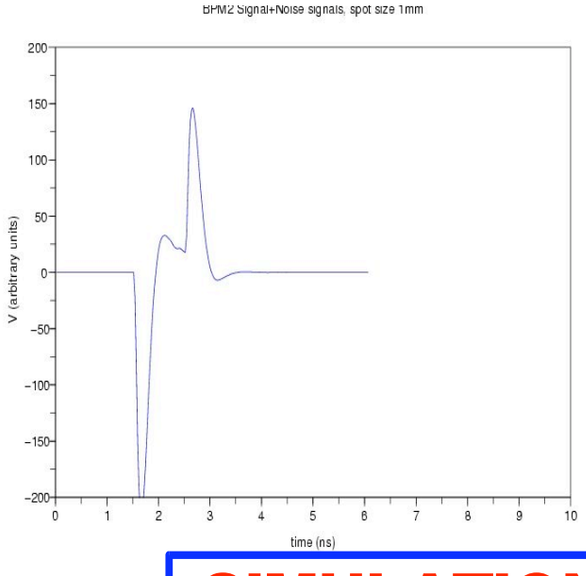
T. Hartin



FONT Test Module (T-488)



DATA



SIMULATION

FONT@ESA run 1 – July06
primary beam directed onto LowZ mask to produce pipe filling spray

2007, insert thin radiator upstream of lowZ mask

ILC Detector Test Beam Worskhop (IDTB07)

Fermilab, January 17-19, 2007

W. Lohmann

Beam Instrumentation and MDI

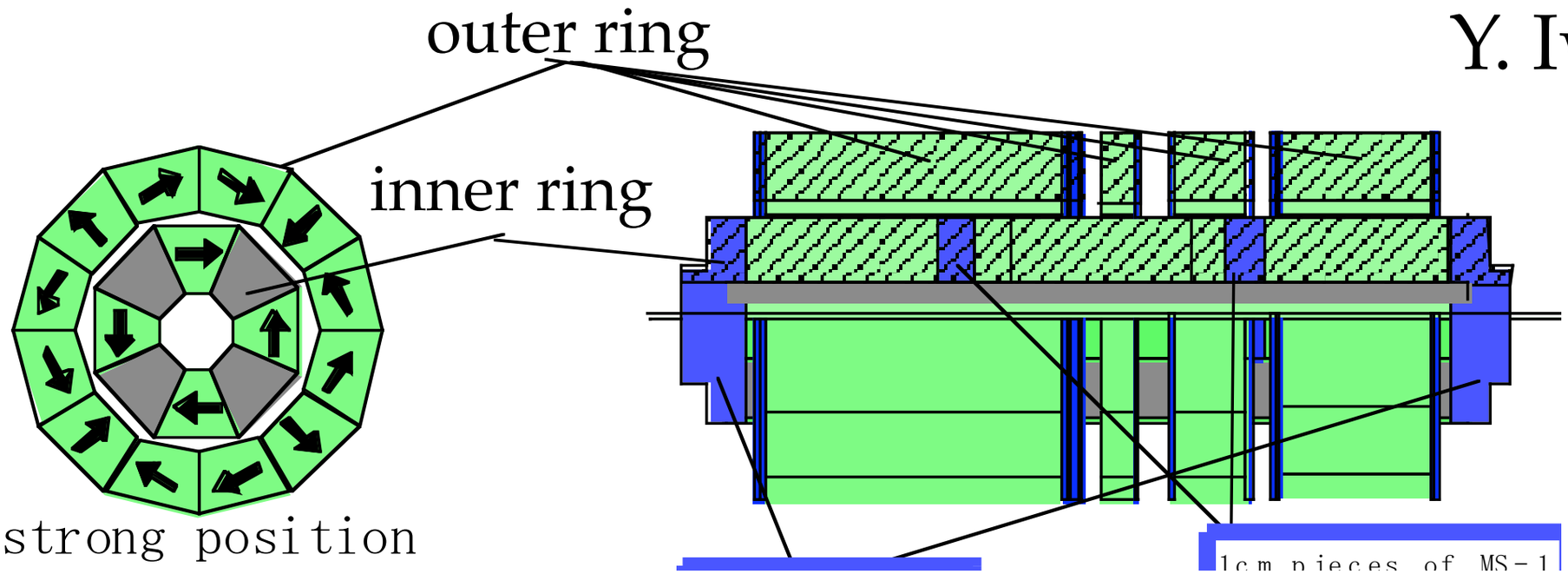
Talks

- Experiments and plans at SLAC (ESA,Saber)
  (M. Woods, C. Hast, SLAC)
- Energy Spectrometer R&D
  (M. Hildreth, U. of Notre Dame)
- FONT R&D
  (C. Clarke, Oxford U.)
- Collimator R&D
  (A. Sopczak, Lancaster U.)
- Experiments at KEK ATF and ATF2
  (M. Ross, Fermilab)
- Very Forward Calorimeter R&D
  (W. Lohmann, DESY)

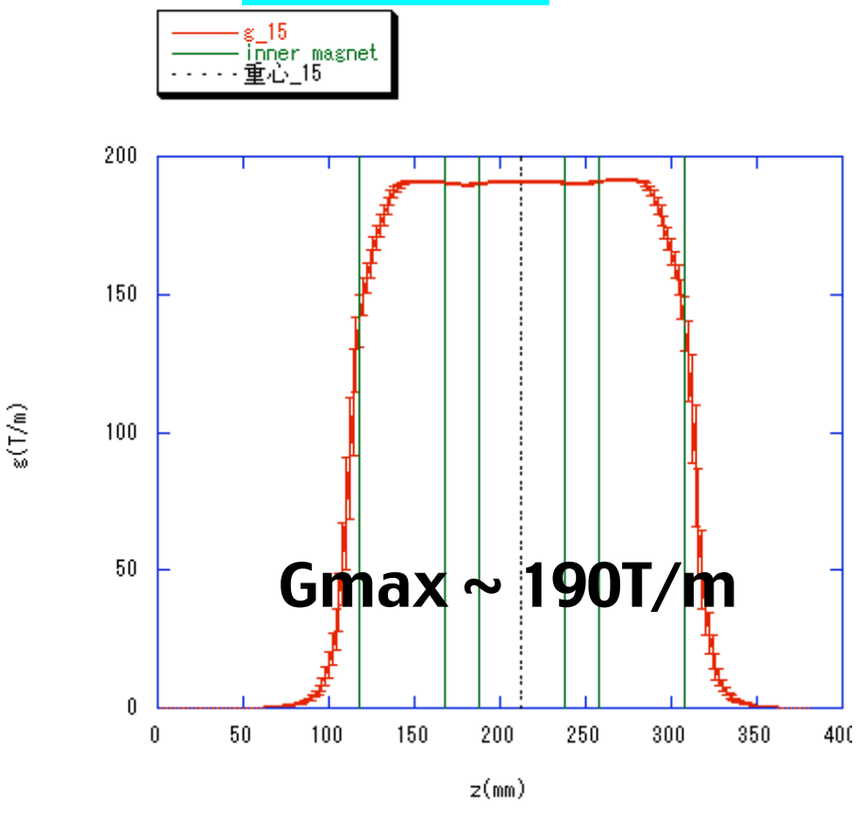
Test facilities : ATF/ATF2 at KEK, ESA, SABER at SLAC

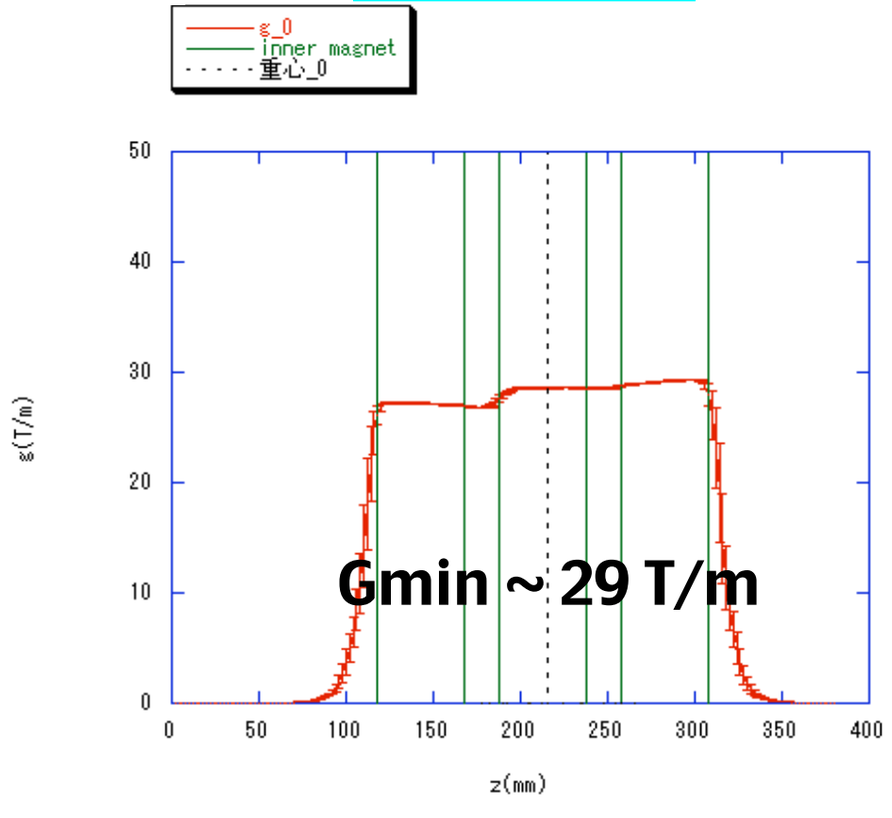
Permanent Magnet Option for ILC Final Doublet Quads and Tail Folding Octupole

Y. Iwashita

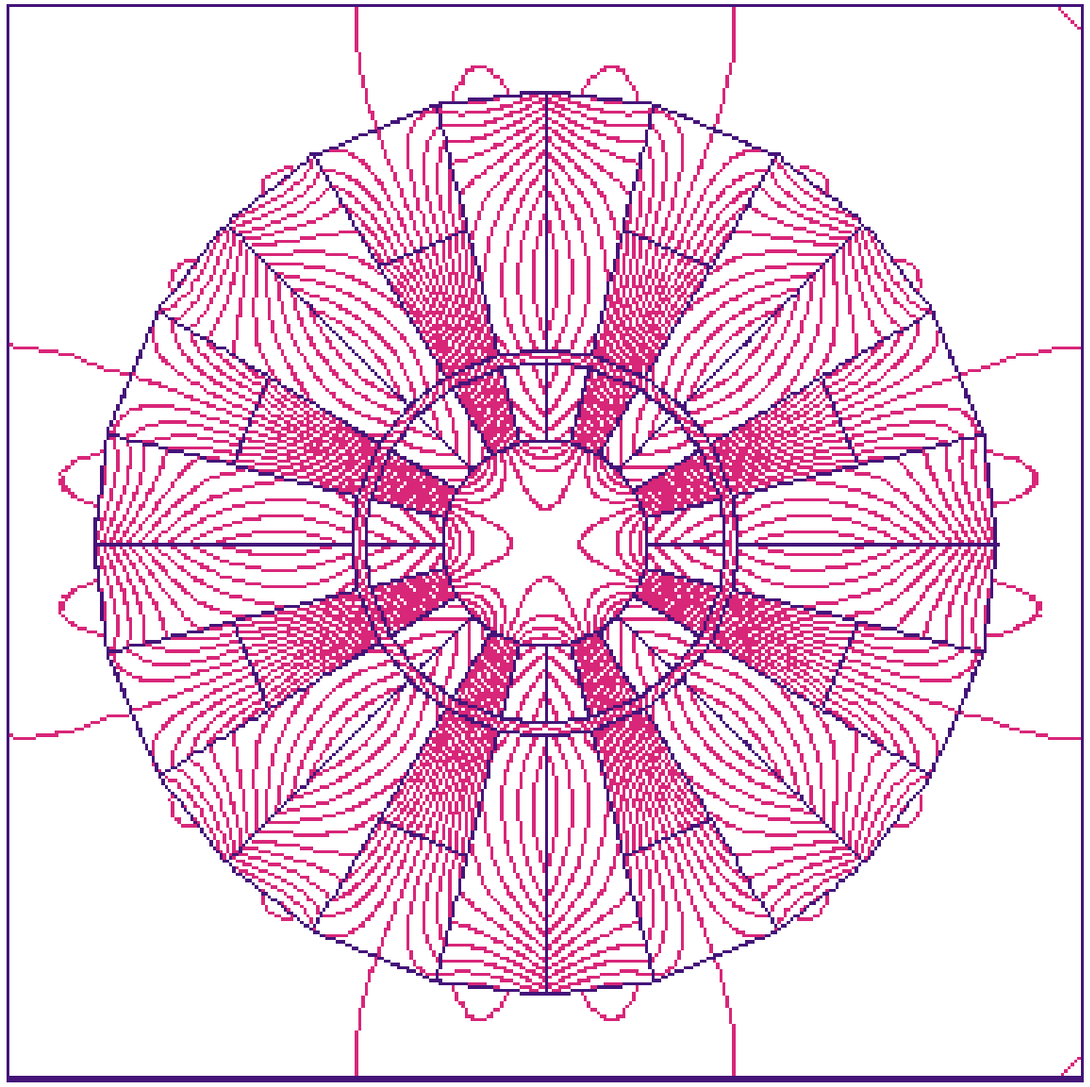


All ON Bore ø15mm All OFF

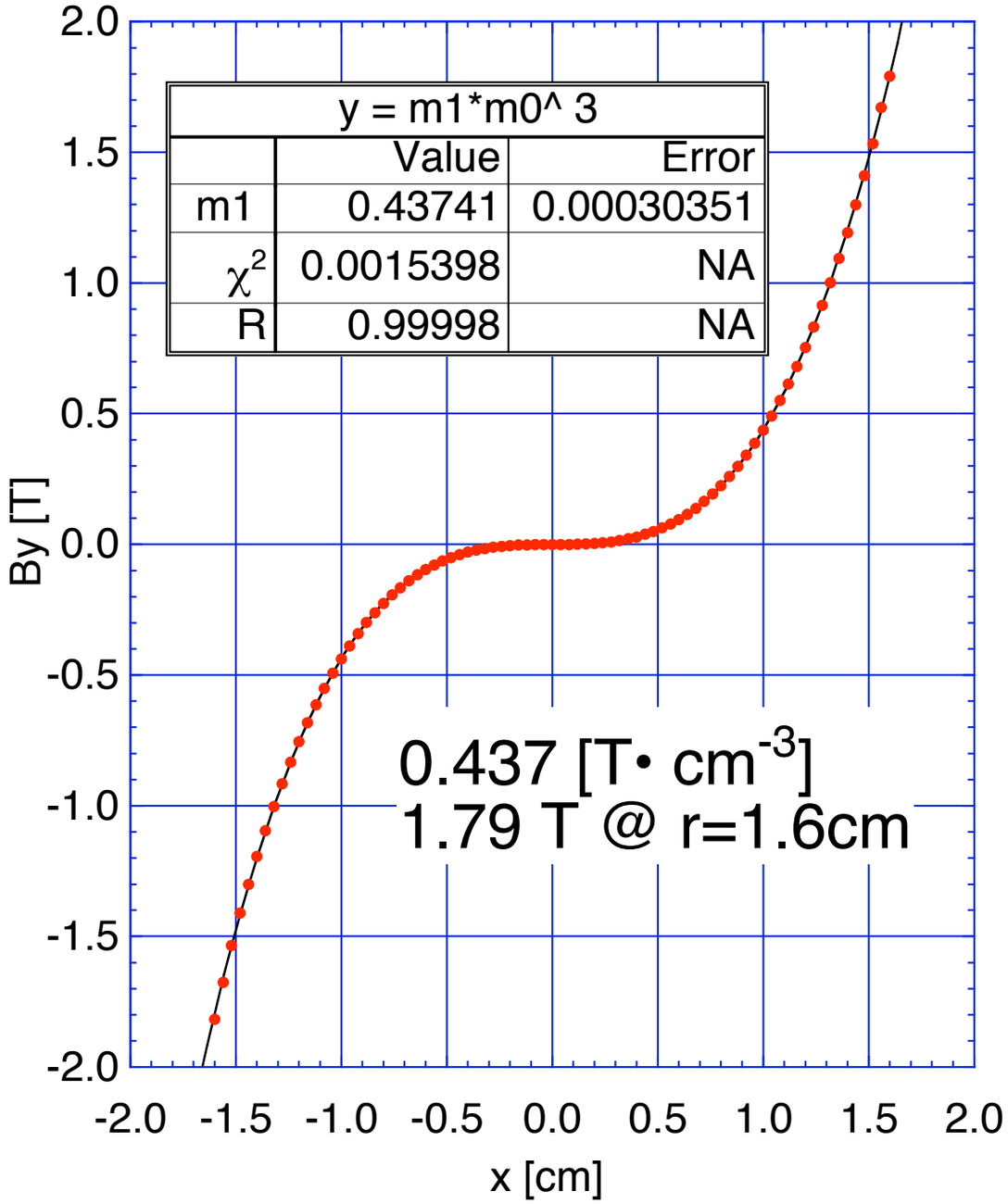




PM-Octupole for tail-folding



Bore ø32 Size ø150



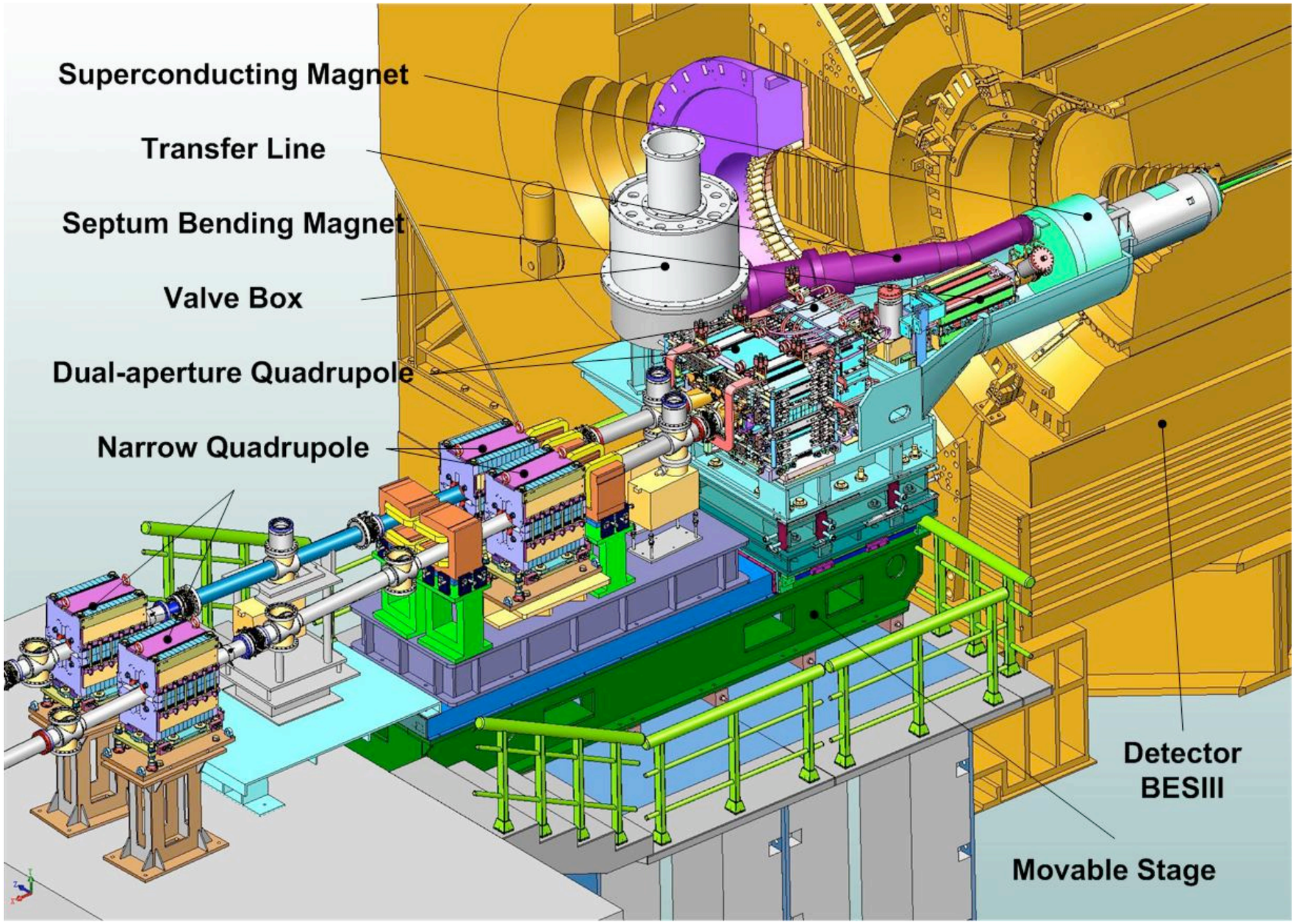
Baseline Sc design: 0.5T@pole tip r=7mm, 1TeVCM

PMO can be very strong; shorter in length (<1/3).

AccLab BmSci ICR KyotoUniversity

Interaction region design and construction for BEPCII

C. H. Yu



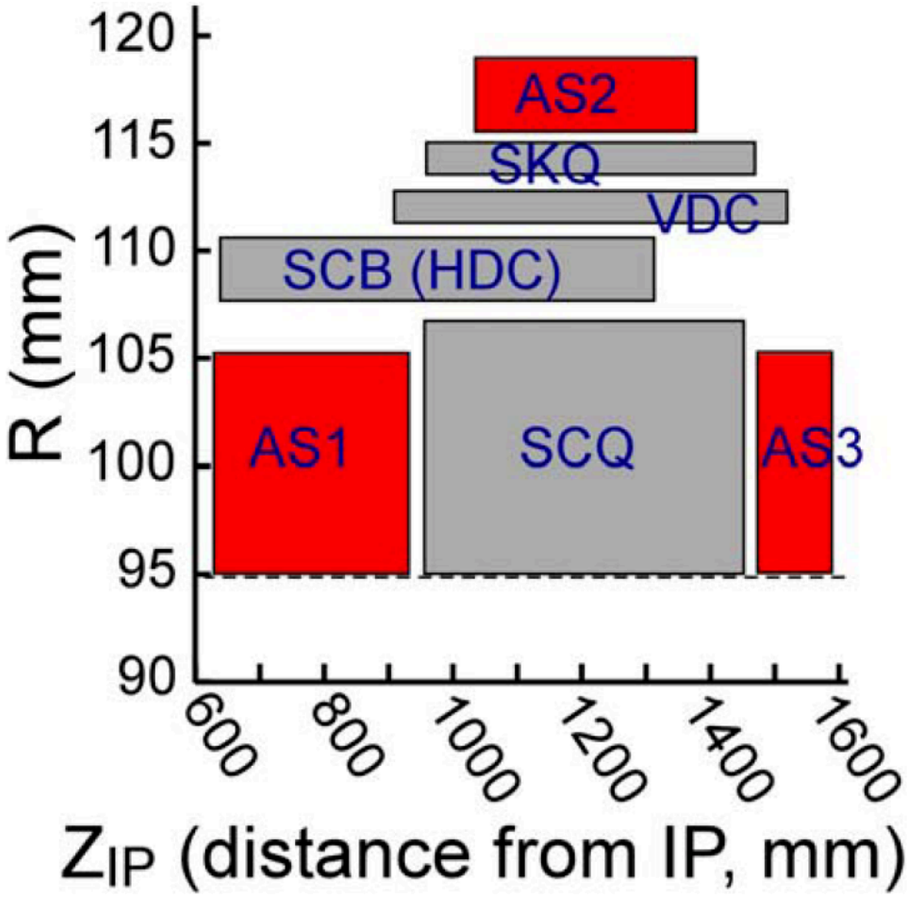
Vacuum chamber will be finished in Apr. The test of superconducting magnets will begin in Jul. Integration and commissioning of BEPCII IR are planed at the end of this year.

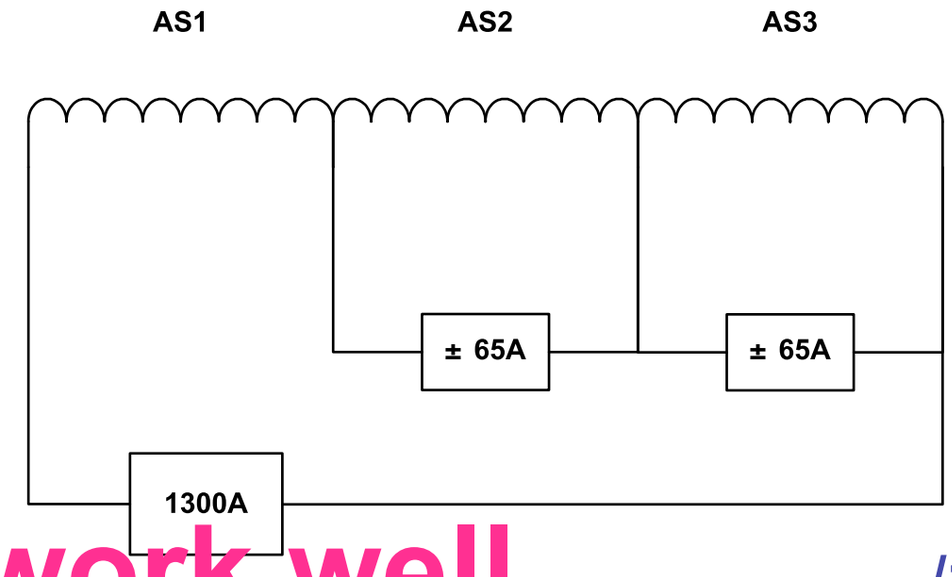
The SC magnets for BEPCII

made by BNL/SMD

CHEN, Fusan

- **Coil structure**
  - 3 anti-solenoid. 300A / 1300A
  - Main quadrupole. 205A / 580A
  - Main dipole.
  - Vertical dipole corrector. ±40A / ±65A
  - Skew quadrupole.
- **Powering configuration**
  - Anti-solenoids are powered in series with one main PS.
  - Two trimming PS are used for current tuning.





Most of the system work well

Thank you !