Discussion items

- Physics (1 slide)
- Accelerator (2 slides)
- Detector (3 slides)
- Funding/Politics (1 slide)

Picked a few items related to new developments. Since I have a small number of slides, please make comments and start discussion immediately.

New Physics Signatures

(there are hints in the current data)

Author: Michael Peskin !!

Commentary on the Belle paper in Nature

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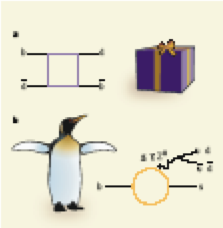
NEWS & VIEWS

PARTICLE PHYSICS

Song of the electroweak penguin

Michael E. Peskin

An unexpected imbalance in how particles containing the heaviest quarks decay might reveal exotic influences — and perhaps help to explain why matter, rather than antimatter, dominates the Universe.



$B \to K\pi$ puzzle

Datta's slides

Table 1:

Mode	$BR(10^{-6})$	A_{dir}	$A_{mix}(S)$
$B^+ \to \pi^+ K^0$	23.1 ± 1.0	0.009 ± 0.025	
$B^+ \to \pi^0 K^+$	12.9 ± 0.6	0.050 ± 0.025	
$B_d^0 \to \pi^- K^+$	19.4 ± 0.6	-0.097 ± 0.012	
$B_d^0 \to \pi^0 K^0$	9.9 ± 0.06	-0.14 ± 0.11	0.38 ± 0.19

- Puzzles:

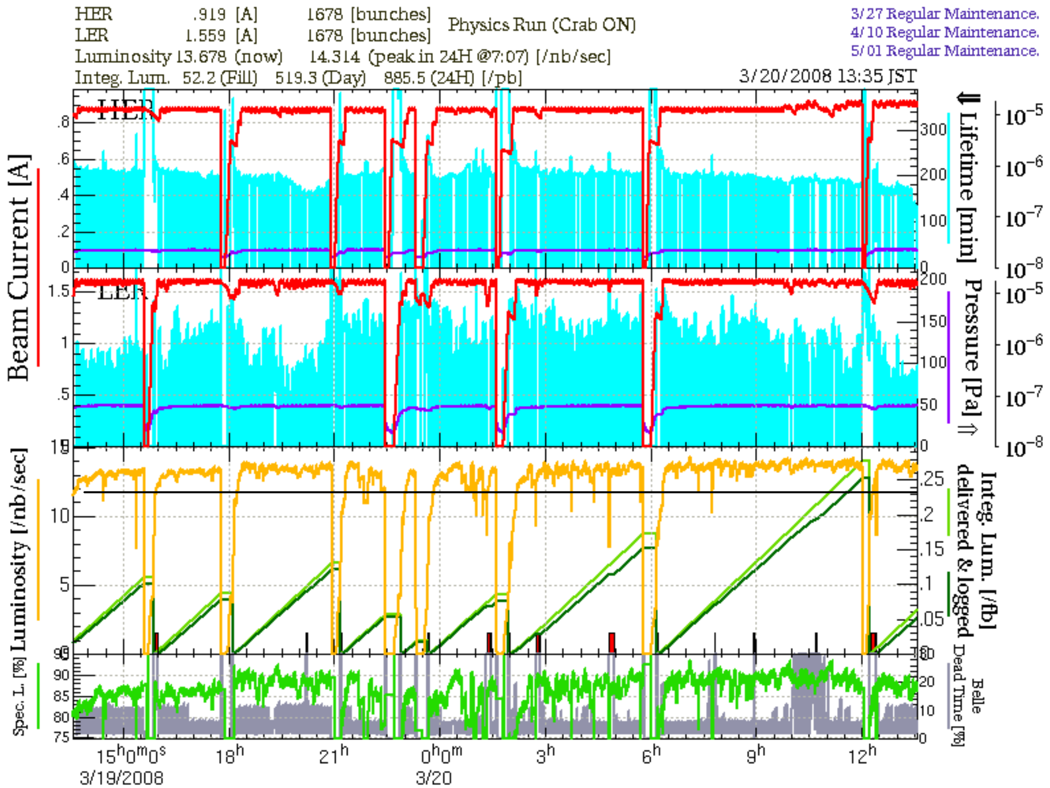
Puzzle 1: $A_{dir}(B^+ \to \pi^0 K^+) = A_{dir}(B_d^0 \to \pi^- K^+)$ using isospin if electroweak penguins(EWP) are neglected. In the SM the EWP are not big enough to explain the data. Need new EWP to explain the data.

Puzzle 2: $B_d^0 \to \pi^0 K^0$ is dominated by a single amplitude and so in SM and hence,
$A_{dir} = 0$ and $A_{mix} = \sin 2\beta = 0.68 \pm 0.03$ in disagreement with data.
Again need new EWP to explain the data.

Discussion Items

Accelerator:

Belle PAC recommended that we allow enough running time for crab cavity development. <u>There was an apparent breakthrough in the past few days.</u>

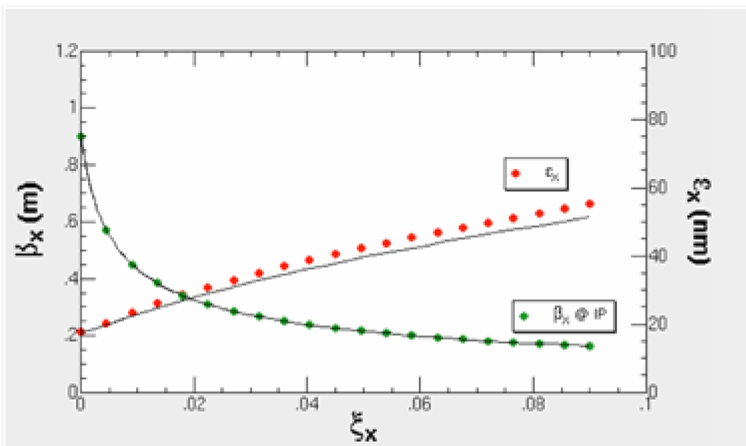


Accelerator plan is becoming increasingly more realistic

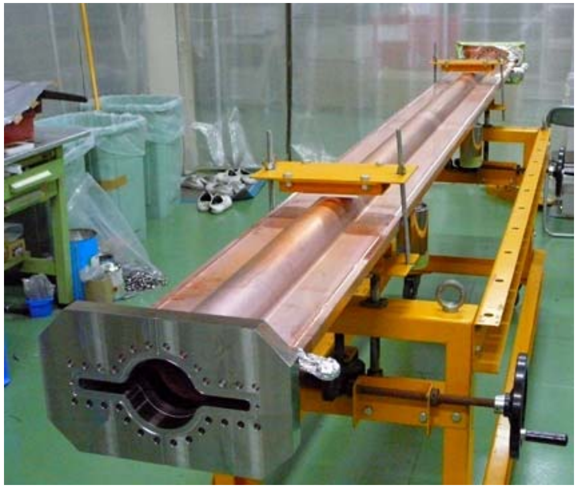
Accelerator dynamic aperture:
importance of dynamic emittance effect
(close to ½ tune) rediscovered.

IR needs redesign will invade even more
of the super Belle detector zone

LER dynamic-β and emittance



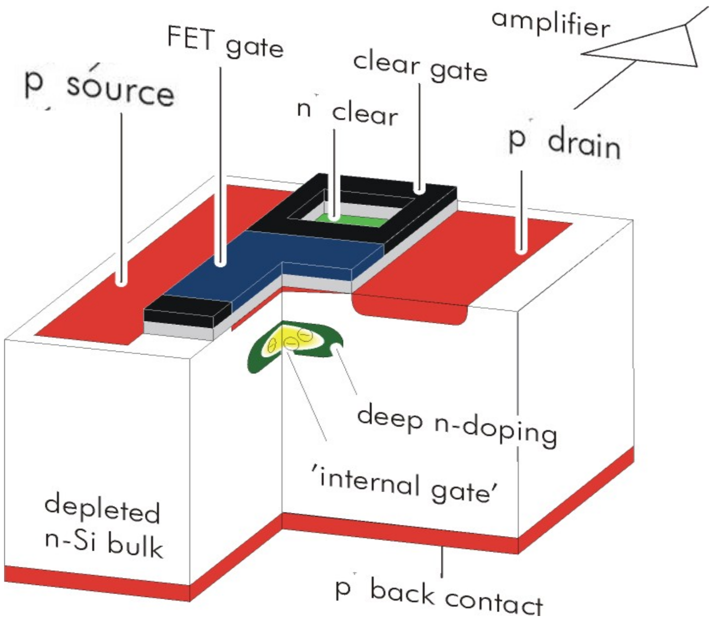
Electron Cloud
countermeasures



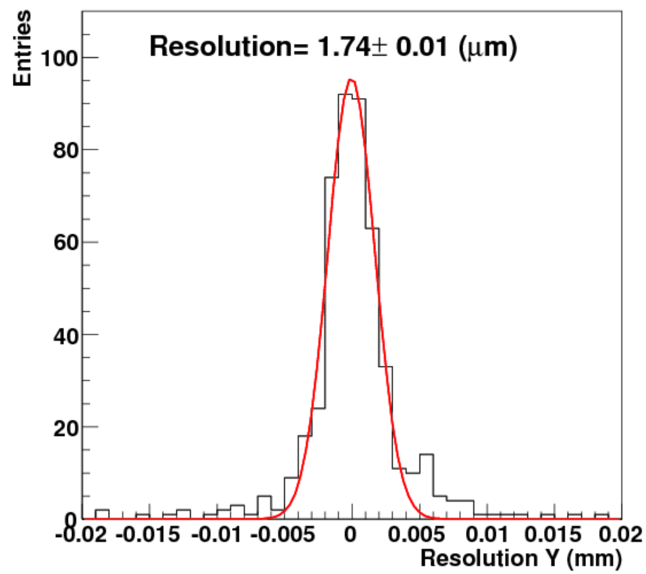
Test of ante-chamber
in LER, good results

→ *IR interface beam background issues need more attention.*

Some detector discussion items



DEPFET from MPI Munich a new and promising possibility for inner vertexing

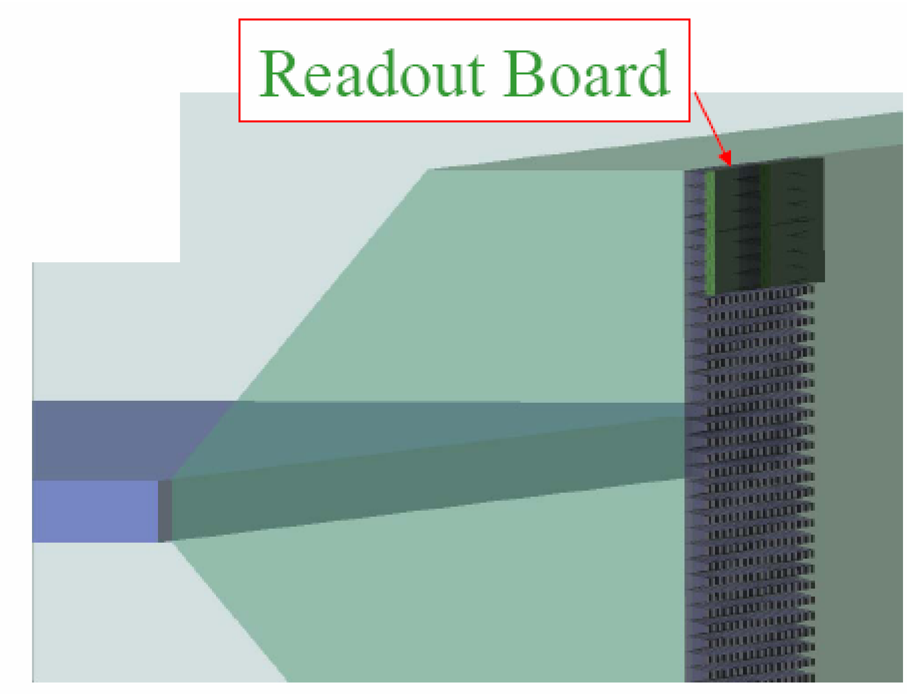


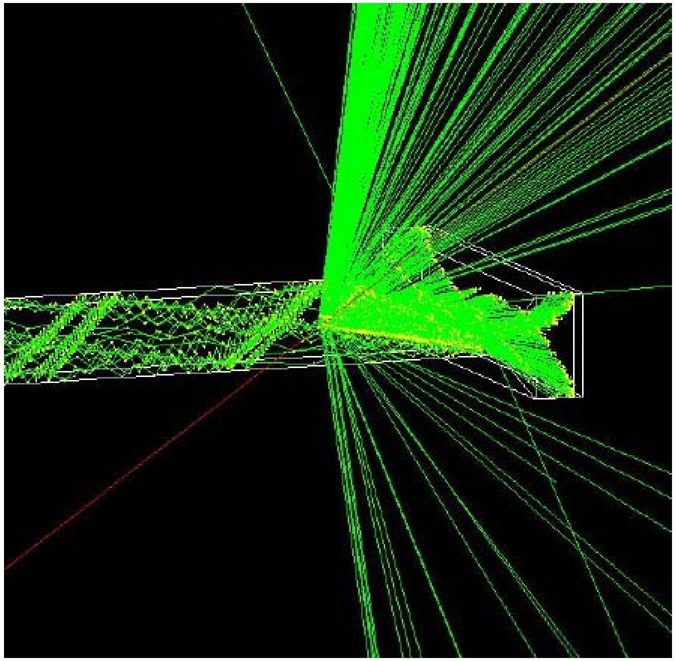
DEPFET beam test results

Do we need a inner vertex detector shootout too ?

Ans: No. We will take any pixel detector that *works*.

PID detector discussion items



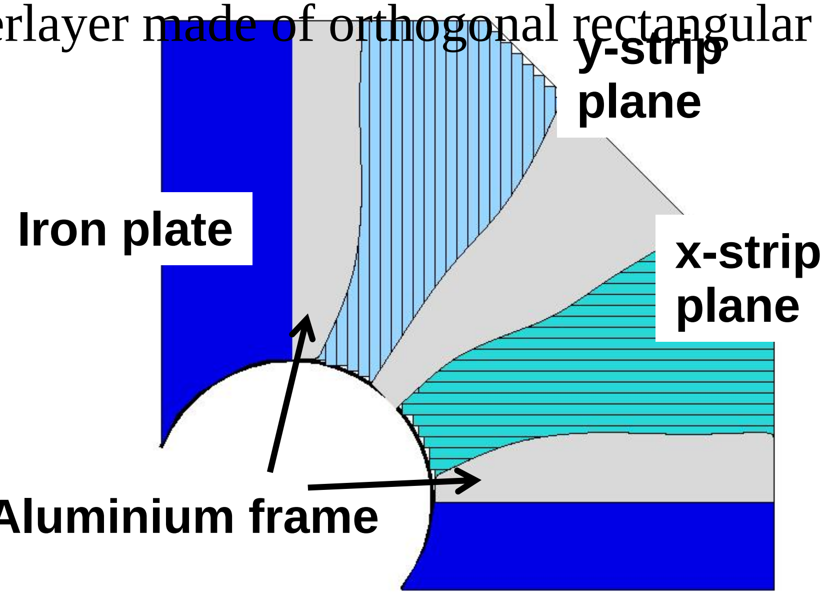


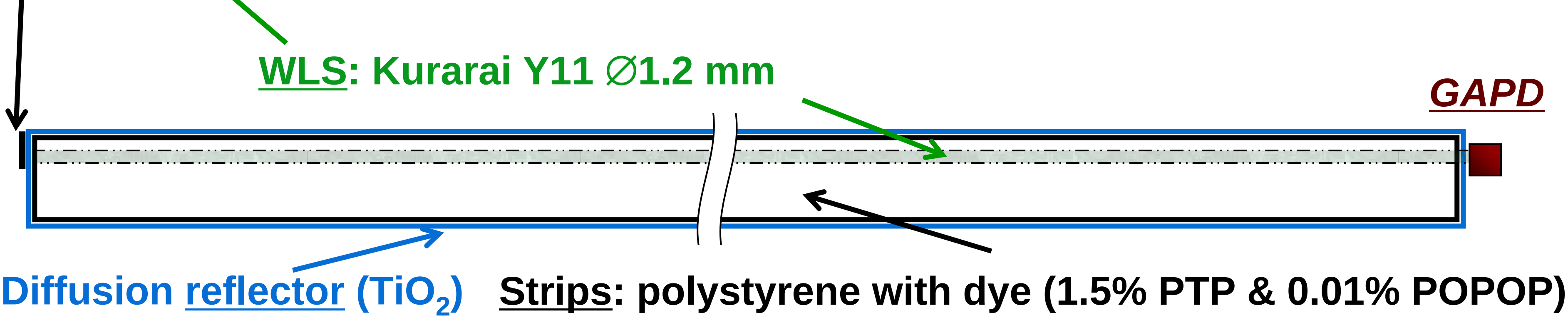
PID will not be based on established technologies(TOP, iTOP, fDIRC). Will need a shootout to decide on barrel configuration and photodetectors

Scintillator based KL/muon detector

“Endcap RPC cannot survive at Super KEKB” – E. Nakano

- The geometry is fixed by the requirement to use the existing 4cm gaps in the iron magnet flux return yoke divided into 4 quadrants. It is also economical to use the existing RPC frames as a support structure.
- Two independent (x and y) layers in one superlayer made of orthogonal rectangular strips with WLS read out
- Photodetector = avalanche photodiode in Geiger mode (*GAPD*)





Politics/Funding/Collaboration

- More activities to promote the SuperKEKB collaboration (message to Suzuki-sama: important to speed up the MEXT internal review).

- Hunt down new collaborators around the world (my experience: many groups on many continents are very interested but are blocked/limited by various political constraints.)

- Try to preserve the openness, democracy and other good features of the Belle collaboration in the new group

- More internationalization 国際化 (kokusaika)