

Agressive Vertexing Scenarios for the LCD

Bruce Schumm

University of California, Santa Cruz

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A Note about Vertexing and Technology

Developments in detector technology over the last 20 years have allowed us to explore the 1 psec scale

There is nothing natural about this scale; it depends on the fortuitous balance of M_W , fermion masses, and CKM couplings

Things easily could have been much different, with a desert between 10^{-23} s and stability.

Corollary: The need for even more precise vertexing is not a given

When does the technology saturate the physics?

All good questions, but it turns out to be easier to ignore this for now, and ask first if vertexing can conceivably be improved.

Some possibilities:

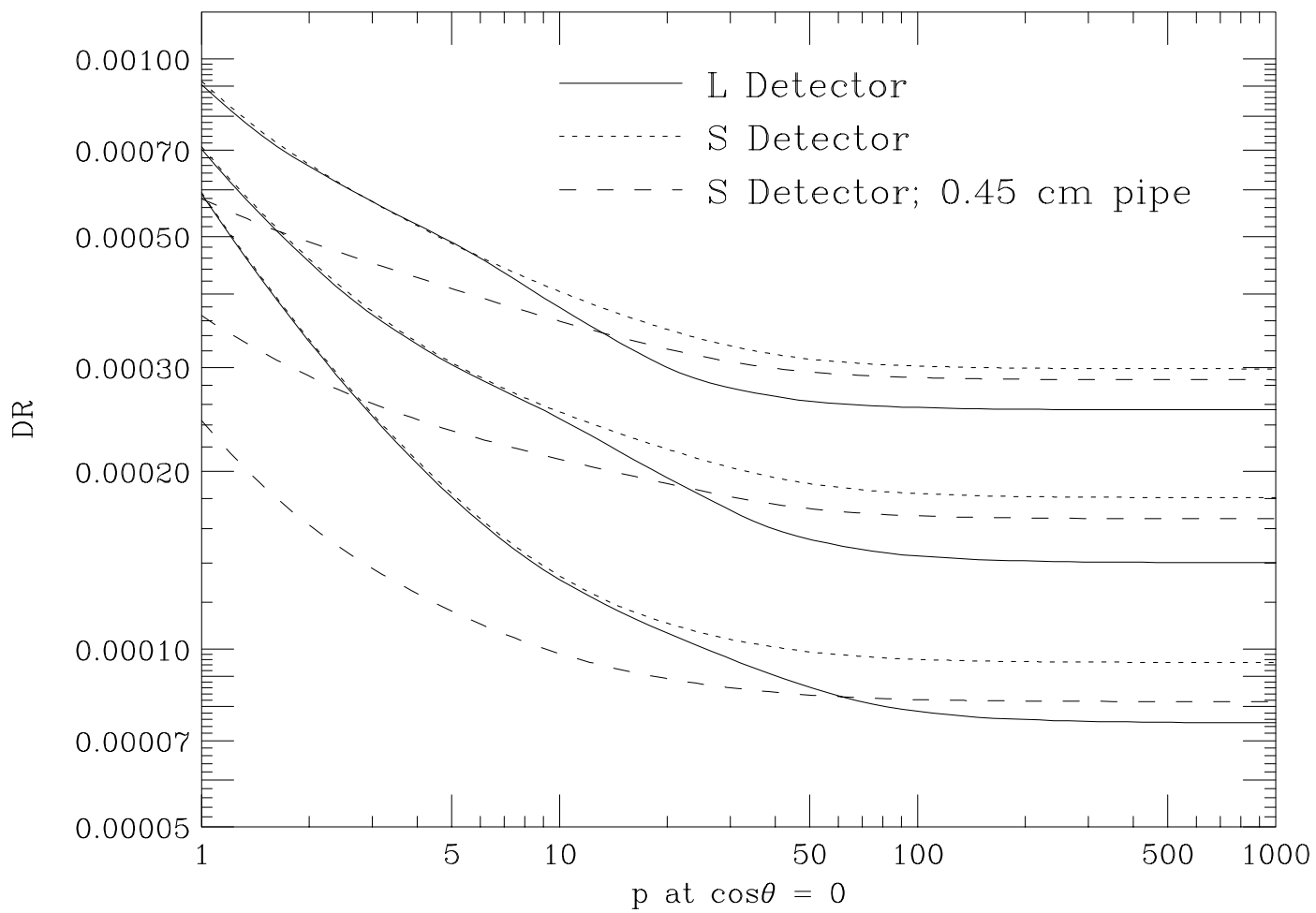
- Has beam pipe radius been considered as carefully for S as for L?

⇒ Consider shrinking S from 1.0 to 0.45 cm (first layer at 0.5cm)

- Has CCD single hit resolution been pushed as far as possible?

⇒ Consider single hit resolutions of 5.0 μm (standard), 2.4 μm , and 1.0 μm

IMP PAR RES FOR 5.0, 2.5, AND 1.0 μm RESOLUTION



Conclusions

Substantial gains in vertexing resolution are not completely ruled out

Single hit resolution helpful for $p > 5 - 10 \text{ GeV}/c$

Beampipe radius helpful for $p < 5 \text{ GeV}/c$

Combination is powerful; produces gain of x3 at high momentum and x4 at low momentum

It would take R&D to pursue this, but could perhaps approach this goal.

But is there anything there??