

## Competing Teams Plot Two Different Paths to a New Particle Smasher

To make a new collider, physicists in Japan plan to push an existing machine to its limits. Others in Italy hope to cobble one together from old parts and a bright idea

13 October 2006, p. 248). That was both a huge victory and a disappointment for physicists, as the theory contains far too little CP violation to explain why the universe contains gobs of matter but essentially no antimatter.

"We all know that the standard model is a fantastic theory," Krizan says, "but we also know that it's fantastically wrong."

requires no conceptual leaps, but circulating nearly 10 amps of current presents its own challenges. The extent to which the beams disrupt each other increases with the number of particles in them, says John Seeman, an accelerator physicist at SLAC, so achieving the luminosity increase may be tricky. The high currents would also increase power consumption of the complex from 40 megawatts to 80 megawatts, raising yearly operating costs by tens of millions of dollars.

In contrast, the SuperB collider would use only 20 megawatts, less than PEP-II did.

But steering its tiny beams into each other may be tough, Oide says. "To collide such tiny beams is not trivial," he says. "It's many orders of magnitude more difficult than producing a single nanometer-sized beam."

SuperB researchers will have to limit vibrations at the crossing point to just 3 nanometers, Oide says. However, if the tiny-beam scheme seems likely to work, then KEK researchers may simply adopt it, too.

# *Comments on Highlights at this meeting*

Fantastic influx of powerful new groups:

As a result we may have solved the inner vertexing problem. DEPFET's work in test beam and can be adapted to super Belle.

*“Red meat for experimental physicists”*

There are many other remaining problems and subsystems that need more people or new groups.

*Machine/detector interface, particle backgrounds*

Outer silicon strips (do we have to do chips on sensors ?)

Barrel PID: make full use of the photon images, build a complex detector subsystem.

GEANT software for detector and physics

Central Drift Chamber !!!!!

.....and there are many more examples.

*A detailed and feasible accelerator plan*

*Good progress on the detector and new groups*

*KEK Roadmap and political and funding progress thanks to director Suzuki*

Next meeting will be the *official* collaboration formation  
*December 10-11 at KEK*

(Belle BGM at KEK, Dec 8-9<sup>th</sup>),

(QWG at Nara, Dec 2-5<sup>th</sup>)

*However, most of the sessions will be “open”  
to all interested persons.*

In the next session will discuss collaboration issues.  
How to join super Belle. The management structure  
of the new experiment and so on.