



**HIGH ENERGY ACCELERATOR RESEARCH ORGANIZATION**

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January 23, 2009

The Linear Collider Detector R&D Collaboration

RE: FY2009 Funding Proposal

To whom it may concern,

This is a letter to support Prof. Giovanni Bonvicini's funding request on R&D for a Large Angle Beamstrahlung device for SuperB.

It has been experienced that the luminosity strongly depends on the beam-optical parameters at the interaction point (IP), such as  $x$ - $y$  coupling, residual dispersion, waist position, etc. It is even more important for a machine like SuperB or SuperKEKB which tries to extract more luminosity per bunch crossing. Although there are a large number of tuning knobs to tune such parameters at the IP, direct signal on the beam profile has been very limited. For instance, in the case of KEKB B-Factory, which has been operated since 1999 and reached  $1.7 \times 10^{34} \text{ cm}^{-2}\text{s}^{-1}$  luminosity, the distribution of vertex detected by the silicon vertex detector (SVD) is the only information beside the luminosity. As the resolution of the vertex detector is about  $20 \mu\text{m}$ , it cannot tell anything about the vertical profile of the beams, whose sizes are about  $2 \mu\text{m}$  at the IP. Also the vertex detector cannot separate the profile of each beam. Therefore more noble detectors to tell the information at the IP should be developed for future high luminosity colliders. This will be more crucial to a nano-beam collider such as the SuperB in Italy and linear colliders.

Prof. Bonvicini's Large Angle Beamstrahlung detector is the very one device to bring such information on the beam profile at the IP. It has an ability to tell the vertical profile of the two beams at the IP separately with practical sensitivity. He has already operated the device at CESR for several years, and obtained positive results basically as predicted. The experience at CESR suggests him a number of possible improvements on the device,

such as the alignment of viewports, more bands of wavelengths to be separated, taking more correlation with other beam information given by beam position monitors. These modifications will polish up the device further and should make it ready for real machines.

A number of  $e^+e^-$  colliders have shut down or are shutting down these days in the world, including CESR, PEP-II, and even KEKB. Therefore the most probable location to verify Prof. Bonvicini's Large Angle Beamstrahlung device is DAΦNE, where beam operation for SuperB R&D has been going on since last year. Thus I would like to support his proposal to implement a prototype at DAΦNE as soon as possible, together with related R&D efforts and education of graduate students.

Sincerely,

A handwritten signature in black ink that reads "Katsunobu Oide". The signature is written in a cursive style with a large initial 'K'.

Katsunobu Oide

Professor,  
Head of KEKB Accelerator Group,  
KEK