We are investigating possibilities of the QD0 cantilever support even with L*=4.1m from the BDS tunnel. As you know, the major motivations are (1) decoupling from the detector,e.g. less vibration transfered from the detector,

(2) separation between the detector and the accelerator elements,e.g. less alignment/repositioning issues after the push-pull operation/cycle, (3) in case of the QD0 pillar support in ILD, no endcap yoke splitting as shown in page-3 (QD0-support-BDStunnel.pdf), where the endcap yoke has to be split in case of the QD0 pillar support, as well as no duplicated QD0 package.

In the page-4, a support system with 3.8m long cantilever is shown, which is very similar to one at the SuperKEKB in the page-16. A large girder of the QD0 support frame carries QF1/SF1,QDEX1S, ZVFONT, QFEX2AS, Crab cavity and SK1. The girder is movable in the BDS tunnel. In this system, a remote vacuum connection (RVC) must be employed in order to slide the support system into the BDS tunnel.

The possible location of RVC is in front of the FONT BPM (yellowish green around the beam pipe) with L*=4.1m as shown in the page-5, where the total length of RVC should be within 205mm as indicated by a red shadowed box. In this case, the cantilever supports only QD0 package, and the forward calorimeters (LumiCAL, LHCAL and Beamcal) are supported in the outer tube sit on the endcap yoke such as the telescopic FCAL support suggested by Yasuhiro Sugimoto (see also in the page-3).

At the SuperKEKB, DESY provided the RVC as shown in the page-6 through page-15, which consist of two 14cm long bellowes tube on a lock flange and the facing rock flange on the QCS.

The page-7 to 13 show how RVC works. It seems to be very compact and must work also at ILC.

The page-14 and 15 show the actual work performances of vacuum pipe connection with the RVC.

The page-16 shows the mechanical design of the QCS support at the SuperKEKB with the load conditions as well as the magnetic forces, where the cantilever length is 2.734m and the moving QCS support frame.

The page-16 to 21 show a series of work for the installation of QCS with the RVC.

The page-22 shows a case of 5.9m long cantilever system, where the endcap yoke can be slided upto the BDS tunnel wall without the vacuum disconnection, i.e. no RVC required but it must be prefereable for easy work.

Finally, possible study items in the ILC prelab are listed as follows;

(1) mechanical design of RVC,

if the length exceeds 205mm, the forward calorimeters should be relocated to make enough space for the RVC

(2) engineering design of the cantilever system with girder carrying the magnets and the crab cavity including repositioning and alignment along the BDS beam line

(3) engineering design of the telescopic FCAL support

(4) ANSYS analysis with these engineering models to estimate the realistic stabilization of QD0 as much as possible

We also need agreeement for the same QD0 support sytem with the SiD group.