SiD Newsletter

Upcoming Meetings & News

SiD Institute Board Meeting September, 22nd 2014

LCWS in Belgrade (October, 6th -15th, 2014), program details can be found here

SiD Workshop January, 12th-14th,2015 (tbc)

SiD Workshop in Japan

By Andy White and Marcel Stanitzki

The SiD Detector Consortium held its first workshop in Japan, September 2nd-3rd. It was kindly hosted by Hiro Aihara and his colleagues at the University of Tokyo. The main purposes of the meeting were to introduce Japanese colleagues to the SiD detector and physics program, and to present opportunities for future participation. Also several speakers presented the status of the ongoing physics studies and R&D in Japan. The meeting was well attended by 35 physicists from Japan and abroad.

Figure 1: SiD Workshop at the University of Tokyo. Image: Rika Takahashi

Talks covered all the hardware, software, and physics studies aspects of SiD. For each component of SiD, the present status of development, the initial baseline technology choice (where available), and the range of technology options were discussed. Emphasis was given to open questions, areas needing additional effort, and opportunities to engage in the work leading to the writing of the SiD Technical Design Report – foreseen to start in 2016. Also discussed was the status of SiD detector engineering, the machine-detector interface components, the scheme for assembling the detector, and its installation in the underground area.

An open invitation was extended to all colleagues to join the SiD Consortium and help towards making SiD a reality.

Site Visit in Ichinoseki

By Andy White and Marcel Stanitzki

As a precursor to the MDI/CFS Meeting in Ichinoseki, a site visit was organized for the participants. Ichinoseki itself is a small city (~ 120000 inhabitants) located in the south of the Iwate prefecture, approx 400 km north of Tokyo. The currently favored location for the ILC is in the Kitakami mountains, which are located just west of Ichinoseki.

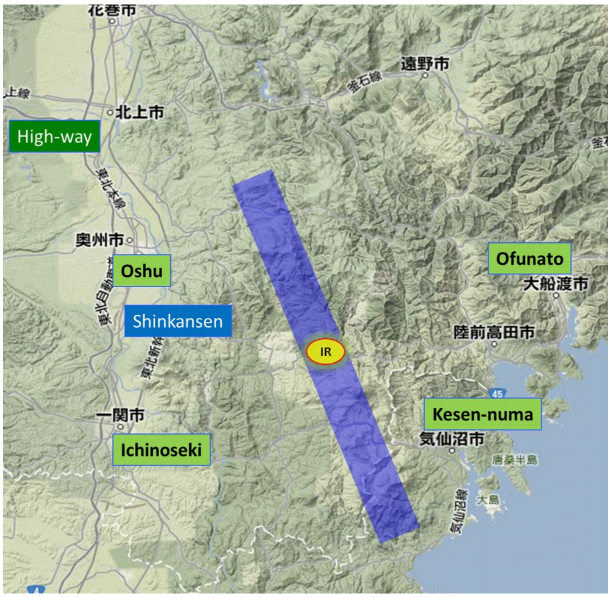

Figure 2: The ILC location in the Kitakami mountains

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Access from Tokyo or Sendai is very easy, as Ichinoseki is a stop on the Tohoku Shinkansen. The trip by train from Tokyo takes a bit more than two hours, while Sendai is merely 34 minutes away.

This tour on 4th of September included the visit of potential sites for the Assembly halls for the Interaction Region (IR), several locations for access tunnels for the machine and a visit to port of Kesen-Numa, which is the closest port to the IR. The drive up to the IR site is approximately 30 minutes. The nature in this region is quite beautiful with gentle slopes and lush green forests. We also learned that up here there are distinct four seasons including significant snow fall in Winter.

Figure 3: The Kitakami Mountains

In the afternoon the tour headed towards Kesen-Numa on one of the roads, where equipment will be transported from the port. The port and the town of Kesen-Numa still show signs of the Tsunami, which hit the coastline three years ago, but the speed of the reconstruction work is very impressive.

The ILC has a strong presence in the Tohoku area. This ranges from signs and displays in the Shinkansen stations, banners on the streets and down to questions in the restaurant asking if we would work for the ILC. We all enjoyed the beautiful landscape during the tour and the warm hospitality we have experienced in Iwate.

Figure 4: Support for the ILC at a local school

MDI/CFS Meeting in Ichinoseki

By Phil Burrows

The MDI, CFS and Beam Delivery System (BDS) teams met in Ichinoseki to advance the design of the MDI at the ILC site in the Kitakami area[1]. A highlight of the meeting was the site visit (see above), including to the location of the surface assembly hall for the IR in both the ‘baseline’ and the more recently-proposed ‘hybrid-A” access schemes. Considerable discussion was focused on a formal change request to adopt the hybrid-A’ model.

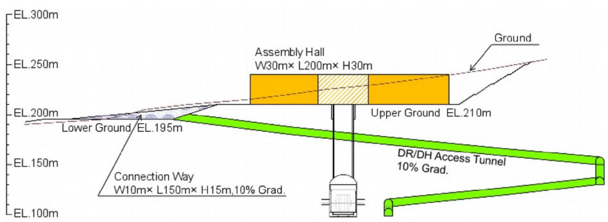

Figure 5: The hybid A' Design as currently studied

In this scheme detector installation access to the underground IR hall would be provided primarily via an 18 m-diameter vertical shaft with

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a substantial gantry crane for lowering the major pieces. Ancillary access would be provided by a roughly horizontal tunnel that is needed earlier in the civil construction for mucking out the damping ring caverns during their excavation phase. Vehicle access is planned for transporting smaller and lighter detector pieces through this tunnel. The scheme would also allow subsequent access for ongoing maintenance activities during the detector operation phase. A second, smaller-diameter, vertical shaft would support a personnel elevator and piping and ducting of detector utilities needed underground. The hybrid-A' IR site is a rural location surrounded by rice fields, farm buildings and small forests whose scenic beauty made a strong impact on the visitors.

Related discussions addressed details of the surface assembly hall and utility pads, as well as strategies for transporting detector components from nearby ports to the IR region. Local regulations on the weight of objects that can be transported on the road network, taking account of bridges, tunnels and obstructions, will need to be followed.

Figure 6: Mochi with various toppings

These will have an impact on the sizes and numbers of components that will need to be moved and assembled locally on-site, and hence on the assembly strategy and the overall schedule.

Details of vehicle access for unloading components at the IR hall, crane capacity, local workshops and office space etc., will all need to be worked out further.

Discussions on the draft change request for the location of the final-focus QD0 magnets are covered in the article by Tom Markiewicz.

The meeting was concluded with a memorable banquet show-casing one of Ichinoseki's signature dishes, Mochi (餅), which is made out of glutinous rice. All attendants of this banquet, which took place in an old sake winery, really enjoyed the local specialty.

Common L* discussion

By Tom Markiewicz

The LCC management group has decided to submit a “formal change request” to the ILC TDR that will specify that “the BDS will support only one common L* for both detectors at a value of 4 m or less”. Representatives from the Accelerator Design & Integration Group (Walker & Harrison) met with members of the BDS WG (G. White) in Ichinoseki on September 4th to review the machine arguments for this change and SiD and ILD were asked to describe the impacts to the detectors on September 5th.

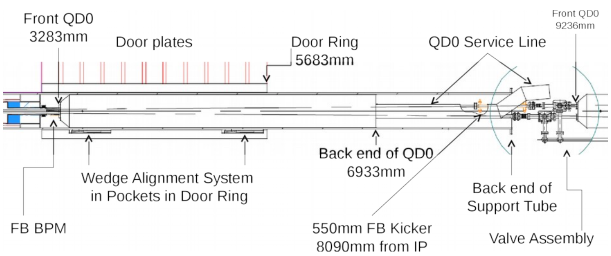

Figure 7: Forward Region of SiD

The change request is based only on two experience based observations. Supporting two different L*s would take more effort and beam tuning time than supporting one L*. Lower L* correlates with higher luminosity, lower chromaticity and more relaxed collimation requirements with lower resulting deleterious wakefield effects. The 4 m L* is seen as a compromise. Currently ILD has an L* of 4.4 m while SiD has an L* of 3.5 m. ILD argued that going to 4 m would require a re-engineering of the rather well developed model of the forward detectors (LumiCal, LHCAL and BeamCal) and expose the TPC to more backgrounds. SiD expressed the belief that the detector could accommodate a change to 4 m. For both detectors it is understood that work is required to fully evaluate the consequences. This evaluation is apparently not required to approve the requested change.

In the discussions following the presentations by Karsten Buesser and Tom Markiewicz, it became clear that the space required for the valves and pumps to disconnect the beamline at QF1 for a push-pull (in the SiD engineering model but not in the ILD engineering model) and the need for and space for pumps to evacuate the central beampipe between the QD0s (in the ILD model and believed by SiD not to be needed) must be clarified. SiD will begin to investigate the impact of keeping BeamCal where it is and moving the feedback kicker and a second BPM in the extra 0.5 m of space between the BeamCal and a QD0. Moving the kicker to the other side of QD0 will allow it to compensate for any vibrations produced by the QD0 support system, a rather important benefit.

Optimizing SiD

By Jan Strube

SiD successfully passed the IDAG validation with a Letter of Intent in 2009 and completed the Detailed Baseline Document in 2012. This was the result of a concerted effort of describing our detector R&D in realistic simulations and benchmarking the detector with selected physics channels. We developed a detailed costing model during this process and showed that the SiD detector concept can deliver ILC physics. So what’s left to optimize, one may ask.

It is very clear that going forward, we will have to ask very detailed questions to each of the technology options for the different subdetectors. This requires a much more complete understanding of how each technology performs than we currently have. Keep in mind, also, that for a PFA detector, the isolated performance of a given subsystem is not necessarily as important as its interplay with the other parts.

To answer these questions, we need to sharpen our simulation and reconstruction tools, and to understand the impact of different technology and layout choices on the physics output. A reduced detector resolution may require longer running time to reach the same physics goal. We are discussing our progress on addressing these questions in weekly meetings that have just recently started. To get a complete picture, we need contributions from experts from all of the sub-detectors. If you want to shape the face of SiD, have novel ideas for improvements, or just want to get a more comprehensive picture of the SiD detector and want to join these meetings, please send us a mail.