

Research Director's Report

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Uniting machine and detectors

"Beijing will be a forum for discussions between the accelerator and the physics and detector community"

This month's Research Director's Report was written by Hitoshi Yamamoto, co-chair of the World Wide Study and regional detector contact for Asia.

A joint international linear collider workshop, [LCWS10 and ILC10](#), will be held in Beijing from 26 to 30 March. LCWS10 is organised by the World Wide Study of the Physics and Detectors for future linear e^+e^- colliders (WWS) representing the physics and detector efforts, while ILC10 is organised by the Global Design Effort (GDE) covering the accelerator efforts. LCWS10 is the twelfth in the series of the global workshops for physics and detectors of linear colliders. There are also regional workshops organised by the Asian Committee for Future Accelerators joint linear collider physics and detector working group (for Asia), those by the American Linear Collider Physics Group (for North America), and by the European Committee for Future Accelerators study of physics and detectors for a linear collider, (for Europe). Originally, the regional workshops were mostly geared toward regional needs and their attendances were also quite regional. I recall that when I attended the 2003 European meeting in [Montpellier](#), France, I was one of only a few attendees representing Asia. Now, the regional meetings have become very much international, and it is difficult to tell regional ones from global ones just by looking at the list of registrants. You may ask, then, why not make all global? The answer is that there still are conditions specific to each region, and only regional meetings organised by regional committees can satisfy those needs. The current idea is to rotate the hosting between the three regions and make every fourth one an global workshop.

The coming workshop, LCWS10, is a global one and also it is a joint meeting with GDE. In fact, WWS and GDE have been organising joint meetings starting from the March 2006 workshop in Bangalore, India. The merit of having a joint meeting is quite obvious since the physics/detector issues and the accelerator issues are the two pillars of the ILC and they are closely related. If there is no realistic accelerator design, there will be no ILC, and if there is no solid physics case or detector designs to realise it, then there will be no ILC either. Or more concretely, if the cost of the machine is too high, then the possibility of realising the ILC is reduced, while if the physics scope is compromised too much, then again the support for the ILC is diminished. In some cases, the cost may be reduced without sacrificing the physics scope, but at a certain point, further cost reductions would require compromising the physics scopes or increasing risk factors that would also result in effective reduction of physics capabilities. The question then is how to find the point that maximises the possibility of realising the ILC and how to agree upon such criteria. In order to come to the final conclusion, we need physics inputs from the LHC. However, we have to decide on one baseline design at this time. This essentially is a political question, and ultimately needs to be decided by the top management; namely, the International Linear Collider Steering Committee (ILCSC), the GDE director, and the research director. Discussions at a more general level, however, would be important to form a consensus acceptable to all. Providing a forum for such discussion is one of the main purposes of the Beijing meeting, scheduled in the morning of the second day. As is the case for all discussions on sensitive issues, open-mindedness and flexibility will be key to its success.

LCWS10 is also the first ILC workshop after the recommendation of the International Detector Advisory Group (IDAG) was officially announced at the Albuquerque, US during last ILC meeting in September 2009. There, two detector concepts, SiD and ILD, were validated and recommended to proceed towards the detailed baseline design which is to be submitted at the end of 2012. The two detector groups are now formulating detailed plans for the next two-and-a-half years, and the research directorate, as well as IDAG, which is the advisory body to the research director, will be overseeing the progress. At the workshop, there will be in-depth reports by the two groups and IDAG will be interviewing them in separate meetings.



CERN has been participating in the ILC project from the beginning, and apart from the obvious effect of the physics results from LHC on the ILC, CERN is an important factor for the ILC. At Beijing, the CERN Director-General will give a report remotely and also there will also be a report on the Compact Linear Collider Study (CLIC) covering both its accelerator and physics/detector aspects. While the LCWS10 agenda is largely focused on the ILC, as the full name of its organising body indicates ('the world wide study ... for future $e^+ e^-$ linear colliders'), the workshop scope expands to any future $e^+ e^-$ linear collider, including CLIC. Incidentally, the next ILC workshop will be a regional one held at CERN, and it will be the first joint CLIC-ILC workshop.

The poster of the Beijing workshop shows a pair of Chinese characters: one means 'protrusion', the other 'dip', indicating a key and a lock that form one entity when combined. One obvious interpretation is that one is electron and another positron that annihilate to elucidate new physics. Or one could be SiD and another ILD that should be able to collaborate to share common R&D projects. However, probably the most productive and urgent interpretation is that one is the accelerator group and another the physics/detector group that get together to produce a set of ILC parameters that is most likely to bring it to reality.

-- *Hitoshi Yamamoto*