NLC Benefits from Continued SLC Operation

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The SLC performance during the last run was very gratifying and it is remarkable that the luminosity was steadily increasing even up to the last day of the run as yet further ideas were implemented. Perhaps the most significant of these ideas, from the point of view of the NLC operation and design, has been the automated tuning of aberrations at the IP. This implementation has lead to a dramatic improvement in both peak and integrated luminosity. The ability to implement such a scheme was seriously doubted by many, and has now been solidly proven. In addition, the attention to the control of backgrounds at the IP has been another essential element of this experience and the use of modeling, to determine methods of background reduction, is now a proven valuable aid. Finally, the real and dramatic effect of luminosity enhancement through disruption has been firmly established, as well as the ability to optimize beam emittance using adjustments of linac orbits.

This leads to the question as to whether there are additional technical benefits to the NLC design program from continued operation of the SLC. We believe that the answer is most likely yes. During the 97/98 SLC/SLD run, the luminosity improvements arose because of improved operational procedures and innovative ideas. At the end of the run, there were still a number of ideas that might yield further benefits to the SLC luminosity and could be applicable to NLC. These include the Model Independent Analysis technique of finding sub-micron signatures in the BPM trajectory measurements, the possibility of demonstrating linac emittance feedback, further background studies, and further study of the luminosity enhancement and beam-beam dynamics. Of course, it is hard to predict the future and likely the most significant benefits will come from unforeseen techniques or discoveries.

Certainly the 97/98 run illustrated the possibilities of a linear collider and a successful future run will help keep the SLC and linear colliders in the spotlight with any new physics discoveries helping to promote linear colliders as a research tool. As indicated by the recent problems with the positron source, there is an ever present risk of hardware failure. A successful run will require a resolute commitment by the laboratory to adequate staffing and preventative as well as run-time hardware maintenance.