Encouraging Greater Engagement by U.S. University Groups With International Linear Collider Accelerator R&D Projects

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Executive summary

The level of involvement by U.S. university-based physicists with ILC projects began to increase in 2002 thanks to a series of workshops held at the University of Chicago, Fermilab, Cornell, and SLAC. These workshops led to the creation of a pair of university ILC R&D consortia, the "Linear Collider Research and Development Working Group" (LCRD) and the "University Consortium for Linear Collider R&D" (UCLC).

The two organizations produced a joint project document[1] comprising 71 projects proposed by groups at 47 universities in 22 states, six national (and industrial) labs, and eleven foreign institutions. The work spanned a wide range of topics in both accelerator and detector physics. Material was submitted in the form of competitively reviewed

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[1] *A University Program of Accelerator and Detector Research for the Linear Collider,* Linear Collider R&D Working Group and University Consortium for the Linear Collider, http://www.hep.uiuc.edu/LCRD/html_files/proposal.html (2002).

proposals. Both DOE and NSF ultimately provided funding for a number of the proposed investigations.

The details of funding, management, oversight, and review have evolved over the last several years. With recent decisions by the funding agencies to reorganize their support of university detector and accelerator R&D it becomes appropriate to discuss a next-generation replacement for the LCRD/UCLC accelerator physics R&D program. In this document I describe a possible shape for a new program, which (modeled after the fashion in which we build detector subsystems for our experiments) is project-driven, rather than proposal-driven. The problem of support for routine non-project expenses such as summer salary and maintenance of shared technical infrastructure is discussed.

Professor Kevin Pitts and I found that interest in greater engagement with ILC R&D is substantial at U.S. universities. At the present time about half the universities that host a particle physics group are participants in at least one ILC R&D proposal. We learned from telephone interviews and data from LCRD/UCLC proposal documents, that approximately 90% of the universities expect to undertake some form of ILC work within the next few years.

I discuss a time scale and preparatory activities that might be associated with an announcement of a new university-based R&D program.

1. Introduction: a brief history of recent university participation in ILC R&D

In January 2002 the University of Chicago hosted a Linear Collider workshop[2] "following the extensive discussion of future initiatives held at the DPF/DPB [Division of Particles and Fields; Division of Particle Beams—divisions of the American Physical Society] sponsored Snowmass 2001 Workshop…" The Chicago meeting was intended to "play a special role in presenting physics potential and the detector issues to a wider group than [had] heretofore been involved." The organizers had hoped that the workshop would "be an excellent opportunity for all to become more involved in shaping a future LC program, and to become more familiar with the issues that surround it."

At that time significant linear collider R&D in the United States was taking place primarily at, or in association with, national laboratories. SLAC was largely focused on the "NLC," an X-band linac built from warm copper structures. Cornell worked on the "TESLA" superconducting linac design in collaboration with the German lab DESY. Fermilab participated in R&D for both machine designs. There was some involvement on the part of university high energy groups, primarily in detector simulation studies. Many (probably most) of those groups were already collaborating on the SLD experiment at SLAC, making it natural for them to participate in NLC work.

[2] *The Chicago Linear Collider Workshop*, Chicago, IL, http://lcworkshop.uchicago.edu/ (2002).

In order to increase the participation of university groups not already engaged in linear collider R&D, a number of us organized workshops, first at Fermilab[3], and then at Cornell[4] and SLAC[5], in April and May 2002. We requested that presenters focus on concrete issues so that participants would return home with ideas for projects they could undertake later that spring. Tom Himel (SLAC) and a number of his colleagues prepared an especially useful database of accelerator R&D projects.

In parallel with this, the directors of the U.S. particle physics laboratories asked Jim Brau and Mark Oreglia to assume leadership roles in organizing the North American physics and detector community; Oreglia and Brau worked with an executive committee nominated by the directors that evolved into the American Linear Collider Physics Group (ALCPG), a subgroup of the U.S. Linear Collider Steering Group (later renamed the Linear Collider Steering Group of the Americas, LCSGA).

During the summer of 2002 U.S. university-based physicists organized the "Linear Collider Research and Development Working Group" (LCRD) and the "University Consortium for Linear Collider R&D" (UCLC) to generate a series of proposals for the funding agencies based on initial expressions of interest written after the Fermilab, Cornell, and SLAC workshops. Coordination of the projects, in part to avoid duplication of effort, was done with the help of LCSGA and ALCPG. Most LCRD member groups held base grants funded by the Department of Energy while UCLC groups were generally supported by base grants from the National Science Foundation.

Even so, the two consortia joined together to produce a single project document[6] of 545 pages, comprising 71 projects proposed by groups at 47 universities in 22 states, in collaboration with six national (and industrial) labs and eleven foreign institutions. The work spanned a wide range of topics in both accelerator and detector physics. The level of university participation in linear collider R&D increased by roughly 50% thanks to the LCRD/UCLC projects. The project document was submitted simultaneously to the DOE and NSF in October 2002, slightly more than six months after the organizational workshops at Fermilab and Cornell. Both agencies ultimately provided funding for a number of the proposed investigations.

The details of funding, management, oversight, and review have evolved over the last several years. The fourth year's project document for the university-based R&D effort[7] is 881 pages long. It holds progress reports from existing projects as well as proposals for new work. Its 366 authors are based at 51 different U.S. universities, eight laboratories, and 25 foreign institutions. The document describes 72 projects, half of which are in the

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[3] *Research and Development Opportunities for the Linear Collider*, Fermilab, Batavia, IL, http://www.hep.uiuc.edu/LC/html_files/workshop_04_05_02_main.html (2002).
[4] *LCCOM: Linear Collider Consortium Organizational Meeting*, Cornell University, Ithaca, NY http://www.lns.cornell.edu/public/LCCOM/ (2002).
[5] *Linear Collider R&D Opportunities Workshop*, SLAC, Menlo Park, CA, http://www-conf.slac.stanford.edu/lcrd02/ (2002).
[6] *A University Program of Accelerator and Detector Research for the Linear Collider*, Linear Collider R&D Working Group and University Consortium for the Linear Collider, http://www.hep.uiuc.edu/LCRD/html_files/proposal.html (2002).
[7] *A University Program of Accelerator and Detector Research for the International Linear Collider (vol. IV)*, G.D. Gollin, ed. (2006). http://www.hep.uiuc.edu/LCRD/LCRD_UCLC_proposal_FY06/

area of accelerator physics. Coordination of detector R&D is done by ALCPG; the current North American university-based detector R&D effort is now structured as an umbrella grant for the Linear Collider Detector R&D group (LCDRD) and administered by the University of Oregon.

It is natural to ask how the level of U.S. university participation in R&D towards the International Linear Collider compares with the maximum that community resources could support, and how the current level of participation actually relates to the level of domestic interest in ILC research. What fraction of U.S. university-based experimental high energy physics groups are actually participating in ILC work? What fraction would if more resources were to be made available? How might the program be reorganized to correct deficiencies evident from our experiences since 2002?

2. The current level of U.S. university-based R&D through LCRD and UCLC

In order to gauge the interest in ILC participation in the U.S. university community UIUC Professor Kevin Pitts[8] and I identified colleges and universities that had at least one Physics Department faculty member who describes herself /himself as a high energy experimentalist. Our goal was to telephone someone at as many of the schools as possible to ask about ILC involvement on their campus. We describe our findings in detail in *Engagement by U.S. University Groups With International Linear Collider R&D Projects* [9].

We conducted telephone interviews with a physicist at 64 of the 104 schools that host an experimental particle physics effort. We found that 58 of the 64 (91%) are either participants in LCRD/UCLC proposals, have concrete plans for ILC involvement, or expect to develop a plan for ILC involvement in the near future.

We knew that 17 of the 40 schools we did not interview were already engaged in ILC R&D work through participation in one or more UCLC/LCRD proposals. We did not obtain any information about the remaining 23 universities. As a guess, perhaps ten of these schools will begin an ILC activity in the next few years. As a result, a reasonable estimate of ILC participation at U.S. universities (either present or anticipated) would be 58 + 17 + 10 = 85 of 104 schools. This number should be compared with the 51 schools that are participants in the 2006 R&D program described in *A University Program of Accelerator and Detector Research….*

It seems safe to conclude that most university groups would like to work on ILC R&D projects but to date only half have managed to get started.

One of the questions we asked during telephone interviews was whether or not “members of your group [would] consider an accelerator project, even if you view yourselves as detector physicists?” Our experience at the University of Illinois is that useful accelerator

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[9] *Engagement by U.S. University Groups With International Linear Collider R&D Projects*, George Gollin and Kevin Pitts, http://www.hep.uiuc.edu/home/g-gollin/Linear_collider/University_ILC_Engagement.pdf, November 16, 2006.

physics R&D can be done by a group that normally works on detector physics projects and that accelerator physics work is well suited to participation by undergraduate research assistants.

We were surprised to see that about half of our colleagues were receptive to the possibility of pursuing accelerator projects. We found that more than half of the universities participating in LCRD/UCLC proposals are engaged in accelerator R&D (31/53 = 58%), but other measures are consistent with this. For example, more than half the schools we interviewed that were not participating in an LCRD/UCLC proposal (15/28 = 54%) were seriously considering pursuit of ILC accelerator R&D work.

3. A new university-based ILC R&D program

The past program: organization of LCRD and UCLC

Between 2002 and 2006 university groups wrote proposals in hopes of obtaining support for their projects. Principal investigators generally took into account which funding agency would receive their proposals when organizing their presentations. Proposals were assembled into a single large document containing both accelerator and detector projects and reviewed by expert panels.

The proposal process was a good first step towards creating an efficient university-based R&D effort, but there is significant room for improvement in how a new program could be organized. These are some of the deficiencies of the first few years' approach:

- Internal management of the R&D program was difficult. The LCRD projects were ultimately submitted to the Department of Energy as a large number of independent proposals for supplemental funding to university base grants. This made management by the LCRD proposal coordinators nearly impossible: they had no authority to withhold funds from groups that were not making progress, or that chose to divert funds to other projects. UCLC projects were better controlled, with Cornell submitting a single umbrella proposal to the National Science Foundation and then routing funds to universities through subcontracting arrangements. In theory Cornell could enforce compliance with the general intent of the proposal and evaluate groups' progress as necessary. But the fraction of the requested support ultimately provided to UCLC by NSF was too low to permit significant progress on all but a small number of UCLC projects;
- The differences in schedules, missions, and regulations governing unsolicited proposals that distinguish the NSF from the DOE rendered more complicated the proposal and appropriations process. Some projects were undertaken by collaborations which included both DOE- and NSF-supported groups;
- The time lag between submission of a project description and arrival of funds could be as long as year. In some years it was difficult to determine the date at which funds might arrive, complicating the planning (and hiring) process;
- Requiring projects to be presented as (competitive) proposals discouraged competent groups from exploring areas of work in unfamiliar domains. This presented the university community with a problem in the style of *Catch-22*. In

order to develop the expertise to write a competitive proposal in a new field, a university group might require a “starter award” to begin their investigations. There was no mechanism in the UCLC/LCRD program to address this need;

- It was difficult for novices to incorporate the ILC’s R&D priorities into their choice of projects, and to choose projects based largely on these priorities;
- There was no mechanism for evolving the UCLC/LCRD organization as the global administration of the ILC came into existence through bodies like the GDE (“Global Design Effort for the ILC”).
- The agencies’ separate funding streams for detector and accelerator work made it more complicated for university detector physics groups to undertake accelerator physics projects. It seemed nearly impossible to incorporate funds for accelerator projects into base grants that were supporting detector groups. This made it perilous for investigators who wanted to redirect their efforts towards the ILC: some of the “costs of doing business” (summer salaries, etc.) would became dependent on the less predictable source of ILC funding.
- The proposal review process was sometimes inefficient, changed from year to year, and differed for accelerator and detector proposals.

In spite of these issues, LCRD/UCLC participants generally worked well together and were open to guidance from the ALCPG and the detector subsystem working group leaders. It was encouraging to see how willing nearly all participants were to act in the best interests of the ILC rather than focusing more narrowly on their own projects.

In 2006 the detector R&D side of the university program evolved into the “Linear Collider Detector Research and Development Working Group” (LCDRD), managed by the University of Oregon and funded primarily by DOE. The current form of the university-based program of ILC accelerator R&D is as yet undefined; a proposal for how this might be organized is the primary focus of this document.

Desired attributes of a new university-based ILC accelerator R&D program

It is useful to consider the desired attributes of a university-based accelerator R&D program from the perspectives of two different constituencies. The first might be described as “ILC insiders” who are responsible for guiding the development of the machine design and the international agreements governing the distribution of work and resources. The second would be the community of university physicists who would like to participate in accelerator R&D, sometimes coming to the work with at most limited prior experience in accelerator physics.

The “ILC insiders” will want support for university projects to be determined by the project’s importance to the ILC as the machine design matures and passes through its R&D phase into a production and assembly phase. They will want to be able to monitor the progress of university efforts and measure them against clearly defined milestones and timelines.

The university groups will want to be able to engage with projects that are important to the ILC and that are well matched to their resources and expertise. At the same time they will want to be able to undertake projects in unfamiliar areas, typically in accelerator physics for a detector physics group. They will want decisions about funding for their projects to be made quickly, with reasonable certainty about the availability of funds, before committing large amounts of time and energy to the project. They will want their department and university administrations to be aware of their involvement and successes. In order to reduce their own administrative burdens they will tend to want their support to flow directly into their base grants, without the presence of both detector and accelerator projects posing an insurmountable hurdle.

Many university HEP grants contain several tasks, mixing contributions for shared resources like computing and salaries for technical support staff among the tasks. There are other costs that must be borne by the base grant such as summer salaries for faculty, funds for a certain amount of conference travel, and support for some kind of seminar series. These are not luxuries: successful groups will sometimes receive matching funds and new faculty lines from their university administrations. The perception that a group's efforts are not valued by the funding agencies (and therefore by the high energy community) will reduce the chances of obtaining support of this sort.

The stewardship of the funding agencies pays an important role in execution and operation of large projects. It is sensible to organize a new university effort so that it is well matched to the procedures and constraints of the participating agencies, taking into consideration many factors, including the different levels of support that will originate with the Department of Energy and National Science Foundation. In my own experience, the very successful Cornell Electron Storage Ring (CESR) and installed CLEO experiment are examples of this, with the NSF playing the major role in CESR oversight, but cooperation with DOE providing a smooth entry into CLEO participation for groups whose funding came from the Department of Energy. Perhaps grouping R&D projects so that each agency bears primary responsibility for particular subsystems whenever possible, rather than having both agencies contribute proportionately to all subsystems, would provide a natural framework for organizing the work.

For some years support provided to university groups for construction projects (for example, design and fabrication of a detector subsystem) has been managed by the national laboratories in cooperation with the management teams of experiments. As a result, it is possible to think of support for an HEP group as coming in two "flavors": one supports the group's salary, travel, and technical infrastructure needs, while the other pays the costs of materials, supplies, and external technical support that is purchased on an as-needed basis. This project-based approach works well as long as funds of the "first flavor" remain available through the base grant. It provides a natural model to consider for a restructured university-based ILC R&D program, and could make help DOE and NSF develop streamlined oversight procedures.

A possible shape for a restructured university R&D program (1): project support

As the GDE moves towards generating an ILC cost estimate, the machine design has necessarily become more sharply defined. One of many example of this is the damping ring complex. A few years ago designs with circumferences of approximately 3 km, 6 km, and 17 km were all under consideration, with injection/extraction kickers that might employ RF techniques, high voltage pulsers, or low energy drive beams. Now the preferred configuration specifies separate 6.6 km rings for both electrons and positrons that employ high voltage stripline kickers. We have moved past the time when parallel explorations of competing techniques is appropriate: a more sensible R&D effort will now focus on projects that are specified and prioritized by the GDE.

The process of organizing the ILC R&D effort is guided by the Global R&D Board[10] (RDB), currently chaired by Bill Willis (Columbia). Also of interest to the U.S. ILC effort is the "Americas Regional Team" (ART), a part of the ILC Directorate[11] that is led by Gerry Dugan (Cornell). The development tasks that lie ahead are organized into a Work Breakdown Structure (WBS), with experts providing oversight and management of appropriate portions of the ILC. These WBS leaders are expected to play significant roles in defining the priorities of the R&D efforts that are, or will be, underway during the next several years.

This is not particularly different from how we build detector subsystems for our experiments. After a period of simulation and design studies we define the calorimeter technology, DAQ architecture, and so forth, and then begin learning how to build the production versions of each of the subsystems. And, as is the case with detector construction, it is sensible to assign various tasks to groups with the necessary skills and infrastructure, rather than asking the collaboration's groups to write competitive proposals for, say, the resources to design and build a low voltage distribution system.

It would make sense for the WBS leaders to generate a prioritized list of projects that are important for progress in refining the ILC design and that are of appropriate complexity and scale for execution by university groups. Project descriptions could include a required completion date and a rough estimate of maximum acceptable cost, and identify a WBS/RDB liaison, sometimes an "ILC insider" working at a national lab. The project descriptions should be generated by WBS managers; a level of detail similar to items in Tom Himel's 2002 list might be sufficient.

Interested university groups could contact a project's WBS liaison in order to discuss a timeline for the work that features milestones that can be used to evaluate progress by the university group. If more than one group is interested in the same project, the WBS liaison could initiate discussions of a collaborative approach to the project, or suggest another course of action.

After these discussions, a university group could then generate a short description of the work to be performed, including an estimate of staffing and resources needed for the project, a timeline, a description of deliverables, and a budget that includes a funding profile. This project description could be used as the basis for a memorandum of understanding if support for the group to undertake a project is approved by the WBS leaders and GDE.

[10] See the description of the "RDB" here: http://www.linearcollider.org/cms/?pid=1000220.
[11] See the GDE organization chart here: http://www.linearcollider.org/cms/?pid=1000219.

After receiving the project description the WBS liaison could discuss the project with WBS/RDB, leading to a decision concerning the release of funds, as well as possible modifications to the project description and budget that will be required before funds are to be released. Grouping projects in a sensible fashion that will allow the funding agencies to oversee a coherent set of projects could be done by the WBS leaders.

After an MOU is written and accepted, the project would begin.

Periodic review of progress could be done by the WBS liaison, based on the project timeline in the MOU. Continued funding might be contingent on reasonable success at staying with the project timeline. Upon completion, a report describing the outcome and findings of the project should be written by the university group(s) involved in the project.

It would be natural to assemble groups' MOUs and project reports into something resembling *A University Program of Accelerator and Detector Research for the International Linear Collider* [12] every year.

Note that a project-driven approach to university involvement with ILC R&D work should not preclude other avenues for pursuit of accelerator research. Submission of unsolicited proposals seeking AARD support would be one such approach.

A possible shape for a restructured university R&D program (2): base grant infrastructure support

It is likely that some detector groups participating in multi-task umbrella grants (as is the case at Illinois) will want to shift a significant fraction of their attention towards the ILC and away from other projects that are winding down. These groups will want to be able to support their share of the common infrastructure and retain the general HEP operating money for conference travel and faculty summer salary that had flowed through their detector physics tasks. As described earlier, this is an unavoidable fixed cost of doing research in particle physics!

It is important that umbrella base grants that had primarily covered detector physics tasks be able to accommodate the sort of baseline operating funds when detector groups pursue ILC accelerator projects. There is already some precedent for this, but it is an issue that needs to be addressed clearly.

Note that some detector groups moving into accelerator physics can be expected to return to detector projects after the ILC machine construction is well underway.

4. Rollout: calling for university participation

[12] *A University Program of Accelerator and Detector Research for the International Linear Collider (vol. IV)*, G.D. Gollin, ed. (2006). http://www.hep.uiuc.edu/LCRD/LCRD_UCLC_proposal_FY06/

The structure of high energy physics research has changed substantially during the last twenty years. It is not just the quantitative change with our experiments becoming larger and more costly, but that each project we put forward is capable of absorbing the entire global pool of resources available for particle physics. Certainly the LHC has shown this to be true, even though its original conception was as a (primarily European) competitor to the (primarily North American) SSC. The rapid progress made by ILC proponents in crafting a mechanism for selecting a main linac technology and then organizing the GDE clearly indicate that we have taken to heart the notion that our largest efforts are best organized as fully international undertakings from the outset.

The ILC is too complex to be designed as a turnkey facility that will be delivered to experimentalists by the accelerator physics community at some future date, and that the larger part of the HEP community can ignore the details as the ILC design moves forward. Significant portions of both the experimental and theoretical physics communities needs to maintain engagement with the project during its design phase.

The rollout of a new university-based accelerator R&D program is more than an opportunity to show our colleagues a list of interesting lines of research. It also provides us with a chance to reinforce the fact of our changing landscape, and a chance to inform research administrators at universities that support HEP groups of this. We have not yet made sufficient use of the universities' government relations and industrial affairs offices for ILC advocacy. In addition, it is hard for us to establish contact with groups outside our physics departments that might be interested in participating in ILC projects if they were to learn of the possibilities—there could be considerable expertise to be found in various engineering and material science departments on our campuses. Establishing contact with the vice presidents for research at HEP-sponsoring universities might open channels of communication to these new constituencies.

Before the rollout, discussions could take place among the WBS leaders, GDE, and the directorates of the national laboratories about the organization of a project-directed program of R&D support (and oversight) of university projects through a subcontracting arrangement based on MOUs rather than competitive proposals. In effect, the laboratories would issue purchase orders for the services to be rendered by university groups interested in becoming involved in R&D projects. This would expedite the delivery of funds for projects and reduce uncertainties present in the current proposal and approval process.

It would be sensible for the GDE and WBS leaders to produce an updated database of projects suitable for university participation.

Information about the projects could be presented to the university community in rollout workshops to be held at national laboratories near major hub airports in mid-winter 2007. Each university that hosts a high energy physics group could be encouraged to send at least one physicist as well as a university research officer (for example, an assistant vice chancellor for research) to the meeting. Holding these workshops before mid-March 2007 would allow sufficient time for groups to engage with the WBS liaisons and generate relevant documentation in order to hire students into summer research assistantships. In addition, discussions among university administrations about the formulation of a coherent ILC advocacy plan could take place during the spring semester.

5. Proposed next steps

The following should be executed in parallel whenever possible.

- Discussions with GDE and WBS leaders concerning generation of a database of projects appropriate for university participation, along with a suggested WBS liaison of each project.
- Discussions with NSF and DOE about the acceptability of a project-driven R&D program and about inclusion of non-project expenses for an accelerator task (summer salary, travel funds, etc.) into base grants primarily supporting detector groups, and a mechanism for requesting support of this sort to go into the base grant.
- Creation of an agenda for rollout meetings, and selection of appropriate date/time and venue for a few such meetings.
- Discussions with GDE and WBS leaders to create and a well-defined list of desired outcomes and follow-up activities.
- Discussions to create a sequence of events and a schedule appropriate for the creation of the R&D program, as well as templates for project descriptions and MOUs.

Appendix: January 2007 message from GDE ART concerning university-based accelerator R&D

Dear colleagues interested in university-based accelerator R&D in support of the International Linear Collider,

This message is being sent to clarify the current plans in the US regarding in future of university-based accelerator R&D in support of the International Linear Collider:

1. Projects currently approved through FY07 by DOE and NSF, via the LCRD/UCLC grants program, will be considered for continuation in FY07. DOE and NSF will review the projects and decide on the level of FY07 continuation funding on the basis of progress reports to be submitted to DOE and NSF in the spring of 2007. The continuation funding will be provided in late FY07. No new grants will be started in FY07.

2. ILC R&D was identified as a high priority for medium term R&D effort by the AARD HEPAP subpanel chaired by Jay Marx, and the DOE/OHEP and NSF/PHY acknowledge that recommendation.

3. The accelerator R&D program which is explicitly supportive of ILC needs in the US is coordinated by the Americas Regional Team (ART) of the Global Design Effort. It is organized into a series of work packages, which may be executed at one of the national laboratories or at a university. University-based proposals to be included in this program will be prioritized, as part of the complete ILC R&D program, by the ART. The ART will make a recommendation for the ILC R&D program jointly to DOE and NSF.

4. Proposals for generic, long-range R&D of interest to ILC and other possible future accelerators are welcome to be submitted to the DOE AARD program, and will be reviewed as part of the general AARD program and judged by their merits in that pool. Phil Debenham (Phil.Debenham@science.doe.gov) is the

acting director of the AARD program. Proposals to the AARD program of DOE/OHEP do not have a fixed deadline. The duration of successful grants varies, but has typically been three years. It would be useful for those proposals that connect to ILC to outline the benefit to ILC, and the synergy that they may have to other potential applications. Proposals for generic accelerator R&D should be submitted to NSF through their PHY/EPP Program on a time scale consistent with their annual PHY target date at the end of September. Marv Goldberg (mgoldber@nsf.gov) is the NSF/PHY contact.

5. The ART is currently engaged in the planning process to make recommendations to DOE and NSF for the FY08 and FY09 ILC R&D budgets. George Gollin (g-gollin@uiuc.edu) is co-ordinating university participation in that planning process, and university groups wishing to get involved in ILC accelerator R&D for FY08 and later years should contact George.

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