January 20, 2005

To: The Reviewing Panel for Linear Collider Detector R&D Projects

Re: Project of the Cornell/Purdue Groups:
Development of a Micro Pattern Gas Detector Readout for a TPC

Dear Reviewers,

It is a pleasure for me to write this letter in support of the grant request by the Cornell/Purdue groups for funding of their R&D project towards development of the best possible detector for the linear collider. The goal of our world-wide R&D effort, involving groups from America, Europe and Asia, is on understanding how to construct a super-high performance Time Projection Chamber as central tracker for the LC detector.

Basically we are striving for an improvement of about an order of magnitude with respect to the Lep detectors on momentum resolution, granularity and other performance characteristics required for the physics to be the linear collider. As can be read in the grant proposal by the Cornell/Purdue groups, this involves proving that one of the modern micropattern gas detectors (MPGDs), GEMs or MicroMegas, will be suitable as gas-amplification stage of the LC TPC, and that in addition ‘thin’ electronics can be built for a one-million-pad TPC.

For the first phase, studying the feasibility of GEMs and MicroMegas, there are about 10 active groups (of about 25 altogether) involved. These groups have been mapping out the parameter space for LC TPC operation with MPGDs – resolution, gas, B-field, pad geometry, etc. Since this parameter space is very large and since sufficient experience with MPGDs for the TPC application has to be accumulated by us, the work of these groups has been highly complementary. There is some overlap which is necessary for cross-checking, but the efforts are by and large not redundant.
The project of the Cornell/Purdue groups fits into this framework exceeding well: Cornell/Purdue want to use their set-up to test all three alternatives for the gas-amplification in one and the same chamber: GEMs, MicroMegas and wires. The wire technology has been used in TPCs up to now so that vast experience exists with its use, and it will thus serve as a reference point for the comparison.

The Cornell/Purdue project is a valuable component of our world TPC studies, and I request that you support it to the highest possible level.

Sincerely yours,

Dr. Ronald D. Settles
LC TPC coordinator