CONCLUDING REMARKS*

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As I see it, the purpose of this symposium has been to assess what Fermilab is doing in spin physics and to determine what it ought to do, as well as sampling community interest for doing it. In this respect I think this meeting has been extremely successful. I certainly have learned a lot and have been impressed with the size and enthusiasm of the spin community as manifested in this meeting. It has been a good symposium, and it is appropriate to express here appreciation to Aki Yokosawa, Phyllis Hale, and all other organizers who have made it such a success.

While I do not intend these remarks to constitute a symposium summary, it is hard not to comment on some of the physics topics which were addressed:

The EMC spin asymmetry measurements are clearly already a burning issue and likely to get hotter in the future. There is still more theoretical work called for. And it will also be good to have another experimental confirmation as well as a measurement of the neutron asymmetry. I never expected things to turn out this way, but the spin sum rule for the n-p difference that I derived long ago (including the QCD modification added later) now constitutes an interesting and very direct test of QCD. If the sum comes out wrong, QCD is wrong.

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Simply wrong. Alas, while the Fermilab muon beam seems an ideal place to do this measurement it seems that circumstances are such that the next round of experiments will stay in Europe.

Evidently an important issue related to transfer of spin from nucleon to quarks is the spin transfer to gluons. To get at the spin structure function for the gluon appears to require measurements of clean QCD hard collision processes utilizing polarized beams on polarized targets. Even at the highest Fermilab fixed target energies and intensities it is not so easy to find such clean processes. Direct photon production and heavy quark production seem to be the processes of choice. But I expect it will require an intense primary polarized beam out of the Tevatron to have a chance of doing this job well. It was quite interesting to find an optimistic opinion from Lee Teng on the feasibility of doing this to the accelerator complex via Siberian-Snakes.

The present spin-physics program in E-704 appears to be in very healthy condition, especially considering the austere boundary conditions Fermilab has placed upon it. What promised to be an engineering run has turned into not only a successful commissioning of the beam and the polarization analyzers but also into some physics results. That enterprise merits warm congratulations for a job well done and best wishes for lots of productive physics in the next running period.

Most of the E-704 physics explores the interface region between hard and soft processes, where spin effects may be especially prominent. An example of this is the inclusive polarization of hyperons, which has been nicely extended to the Ω^- by the E-756 group. As Tom DeGrand discussed, the hyperon polarizations show regularities which invite a not-

yet-existing crisp theoretical interpretation. But at least the regularities seem to be there.

There are also interesting two-body scattering processes in the works, as well as the elegant A_{L} measurements yet to come from E-704. Spin effects in exclusive channels are a special challenge to the QCD theorist. And mention of this subject instantly conjures up the image of Allan Krisch, who regrettably could not attend the symposium. But it is easy to guess his message: someone (guess who) should measure spin effects in elastic scattering at the highest values of s and t possible. And this in turn brings us back to the question of polarized beams from the Tevatron. If indeed this is feasible technically - and I believe this needs careful scrutiny by the accelerator community - there still are considerable obstacles to overcome. It may well be that the material cost of the project is not large. But there would necessarily be considerable amount of skilled manpower given over to it, plus a nontrivial amount of commissioning time and dedicated running time of the Tevatron complex devoted to this program. Such a spin-physics program therefore directly competes for precious time with the collider and remaining fixed target program. This priority problem is, I believe, a difficult one, and best solved were there several experiments interested in polarized beams delivered into their apparatus. Candidates would clearly include existing fixed-target hard-collision and heavy-flavor experiments, as well as other "new-proposal" initiatives (elastic scattering? a polarized gas-jet target in the Tevatron ring?). In any case such an enterprise will be strongest if it is collective in nature. I think it is also prudent to have any such consortium of interested experimental groups to

itself do as much homework as possible on the machine-physics issues and not wait for the laboratory to take that initiative.

It is clear that at the present time spin physics is full of vitality, with fundamental issues very much at stake. I hope and expect that Fermilab will be making many important contributions. To all of you engaged in the pursuit, my best wishes.