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Panel Discussion—Cooperation in Detector Development and Instrumentation in High Energy Physics: Comments

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September 1990



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PANEL DISCUSSION - COOPERATION IN DETECTOR DEVELOPMENT
AND INSTRUMENTATION IN HIGH ENERGY PHYSICS
COMMENTS

International Seminar on High Energy Physics
Protvino, Moscow Region, U.S.S.R.
September 1990

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I speak from the perspective of a very large detector collaboration (SDC) involved in the design of an SSC detector. This process is in an early stage, and we have much to learn from the experience of others.

It is perhaps useful to begin by summarizing the justifications for international collaborations in detector R&D, fabrication, and physics exploitation:

- 1) To get the large intellectual resources needed to meet the challenges. No single region has a monopoly on intellectual capital.
- 2) To get the technical and financial resources to support R&D, fabricate the detector, and provide means to exploit it.
- 3) To take advantage of industrial capabilities all over the world.
- 4) To take advantage of the cultural benefits of international collaboration and interaction with developing countries.

The strong international tradition in high energy physics has been pioneered by CERN and JINR.

It is interesting to note that just as we have large detector collaborations, we also now have global R&D collaborations. As an example the silicon strip detector R&D collaboration for the SSC consists of a huge number of institutions from all over the world and has a scope which is equally global: simulation, mechanical problems, cooling, electronics, radiation hardness, cost optimization, etc.

Let me now discuss some of the challenges posed by large international collaborations:

- 1) Communication capability

This is essential to a geographically dispersed group. We need good computer links for mail, transmission of reports, transmission of detailed engineering drawings, and eventually video-conferencing.

2) Maximizing personal interactions

This implies support for travel expenses and subsistence expenses, and the flexible handling of administrative issues (DOE approval for foreign travel, for example) and visa issues.

3) Management issues

We need to learn how to make optimal use of a highly dispersed collaboration. Some elements of this might involve:

- a) "Local management" for convenient geographic groupings
- b) Insuring visibility of collaborators in their home countries
- c) Ability to deal with many different funding agencies
- d) Insuring quality control
- e) Schedule reliability for both accelerator and detector.

We need new solutions, sensitivity, and determination by the accelerator laboratory to develop and maintain realistic schedules.

I now consider a few other issues:

1) Industrial involvement

A new pattern seems to be emerging which involves closer collaboration with industry. In the SDC experience, we have our silicon strip colleagues working with UTMIC for radiation hardness, our calorimeter colleagues working with Westinghouse Science and Technology Center for mechanical design, our scintillation fiber colleagues working with Rockwell to develop state-of-the-art readout methods, and our pixel-detector colleagues working with Hughes on electronics and mechanical design. The industrial interest seems focused on the possibility of eventually fabricating something of significant magnitude for the detector.

2) Test Beams

There are more needs for spigots than there are test beams available around the world. We need international collaboration among the owners of test beam facilities to provide all relevant experiments what they need.

3) Continuing Support of R&D

We need to urge funding agencies to provide detector R&D support on a larger and more stable basis. New technologies will be needed for the next generation of detectors, and still more advanced technologies for later generations. We cannot stop this effort even when the first generation of new hadron detectors is designed.

In summary, there are many challenges. Physics is the driving factor: if we want to do the physics we must overcome these challenges and work together to exploit our unique facilities.

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