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# OAK RIDGE NATIONAL LABORATORY

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ORNL

## FOREIGN TRIP REPORT

ORNL/FTR-3614

**Date:** May 26, 1990

**Subject:** Report of Foreign Travel of F. Plasil, Section Head,  
Physics Division

ORNL/FTR--3614

**To:** Alvin W. Trivelpiece

DE90 011922

**From:** F. Plasil

### PURPOSE

To attend a WA80 collaboration meeting at CERN, Geneva, Switzerland; to attend the International Quark Matter '90 Meeting in Menton, France; and to hold discussions at CERN with D. L. Hendrie of DOE and with members of his staff.

### SITES VISITED

5/2-4/90	CERN, Geneva, Switzerland	H. H. Gutbrod
5/6-11/90	Menton, France	A. Romana
5/13-14/90	CERN, Geneva, Switzerland	D. L. Hendrie

### ABSTRACT

The traveler attended a WA80 collaboration meeting at CERN, Geneva, Switzerland, May 3-4, 1990. Most of the meeting was devoted to the writing of a proposal for a new experiment, which will be the successor of WA80. The traveler attended the International Quark Matter '90 Meeting in Menton, France, and chaired the closing session. The next meeting in this series will be held in Tennessee and will be chaired by the traveler. The traveler returned to CERN to hold discussions with D. L. Hendrie of DOE and with members of his staff. The WA80 experiment was shown to the DOE staff members.

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## REPORT OF FOREIGN TRAVEL

### I. WA80 Collaboration Meeting, Geneva, Switzerland

Only about one-fourth of the meeting was devoted to the ongoing WA80 activities and to the current proton test/calibration run. The rest of the time was devoted to the formation of a new collaboration, which will succeed WA80, and to the writing of a new proposal.

It was reported that the assembly during March of the two new towers, each containing 1400 modules of lead glass, had gone extremely well, as did their calibration in the test beam during April. The lead glass, the phototubes, and the bases were obtained from the Kurchatov Institute, and the assembly took place in record time with Kurchatov, BNL, ORNL, Lund, and GSI personnel participating. Plans for the installation of a new trigger system and for the heavy-ion run (scheduled for August 1990) were discussed. The Plastic Ball has been removed, as has the fifth six-pack calorimeter. MIRAC was slightly reconfigured and placed on a fixed platform. SAPHIR was recalibrated and will form the bottom leg of a U-shaped lead-glass configuration, with the two new lead-glass towers forming the two vertical legs. A significant increase in the  $\phi$  coverage of the photon detector will thus be achieved. The streamer-tube multiplicity arrays have also been reconfigured to provide double-layer coverage of the U-shaped photon detector. Tests/calibrations of the small BGO test array were about to be performed at the time of the collaboration meeting. All main detector systems appeared to be nearly ready for the upcoming heavy-ion run, with the exception of the trigger, which will be reconfigured in June by G. R. Young of ORNL and H. A. Gustafsson of Lund. The LBL and BNL groups will participate in the 1990 run, but not in the new experiment which, if approved, will be ready for the 1991 run.

A rough draft of the new proposal was available at the start of the collaboration meeting. New participating institutions were introduced. These include the University of Geneva, the Kurchatov Institute (already a member of WA80), and several institutions from India, operating under the leadership of the Variable Energy Cyclotron Center (VECC) of Calcutta. Regrettably, no representative of the Indian consortium was present at the collaboration meeting; and it was decided that, in the future, institutions that do not participate in collaboration meetings may not continue as formal member institutions of the collaboration.

The new proposal is aimed at the projected availability of lead beams at CERN, although it is presented as a free-standing experiment which will make use of the 1991 sulphur beam. The experiment will incorporate the existing lead-glass array, but several new detector systems will be added, as well as a vertex magnet. The combined setup is referred to as the "Light Universal Detector for the Study of Correlations Between Photons and Charged Particles." This name was a mystery to the traveler until it was pointed out that the SPS Committee (SPSC) in a long-range consideration of the CERN lead-beam option commented that, in addition to all existing expressions of interest, there was room for a "light universal detector." In the past, the SPSC has kept WA80 on a short leash, grudgingly granting approvals

one step at a time. For example, final approval for the August 1990 sulphur run is not expected until the end of May! (The traveler, in a private meeting with the CERN director of the fixed-target program, Pirre Darrioulat, expressed dissatisfaction with the state of affairs, since it does not permit even short-range planning in an orderly fashion.) The reasons for submitting the new proposal at this time (and rather hurriedly) are as follows: (1) to obtain the views of the SPSC as soon as possible so that pending German funding for the BGO detector, blocked as a result of SPSC's actions, could be shaken loose; (2) to allow for as much time as possible, in the case of proposal rejection, to consider alternatives (probably leading to the end of ORNL's participation in the CERN program); and (3) to establish the new collaboration as one of the potential major players during the lead-beam era at CERN. (The earlier lead-beam letter of intent based on a merger between WA80 and NA35 is now obsolete.)

The new detectors of the proposal are a BGO array (500–1000 pixels) with longitudinal segmentation; multistep avalanche counters for charged-particle tracking, and a preshower pad-readout detector for photon multiplicity measurements. The written proposal is available on request; details are not given here. The new approach, which is expected to enhance the photon measurement capability, involves the use of longitudinally segmented BGO. It is shown via simulations that a very clean separation of hadronic and electromagnetic showers is possible when each BGO module is divided into two segments, one of  $7 \chi_0$  and the other of  $15 \chi_0$ , with each segment read out separately. Adjacent electromagnetic shower separation is also greatly enhanced by longitudinal segmentation.

Modifications to the proposed setup that are anticipated when lead beams become available are discussed in the text of the proposal. Given the large multiplicity of produced particles, it may be possible to select individual events that involve an excess of photons by comparing, event-by-event, the measured charged-particle and photon multiplicities. The photon spectrum reconstruction would then be carried out only in the case of the preselected events.

## II. Quark Matter '90 Meeting, Menton, France

The last meeting in this series was held in Lenox, Massachusetts, in the fall of 1988. The Menton meeting was organized by French scientists with apparently little (or highly selective) input from the International Advisory Committee, of which the traveler is a member. The net result was a rather distorted coverage of the field in both the experimental and theoretical areas. A very large fraction of the time was devoted to the  $J/\psi$  suppression phenomenon and to its various interpretations. Of more interest were the newer results on  $\phi$  enhancement. The choice of several invited speakers who were supposed to present the status of various subfields was questionable, and several of the talks were not at the forefront of current work. In one public exchange, Rafelski complained bitterly that the speaker who presented the status of theory on strangeness production failed to take note of all studies aimed at distinguishing strangeness production in a quark-gluon plasma from that in very dense hadronic matter. Other notable imbalances include the nearly total shutout of the Frankfurt school in the theoretical area and of WA80 in the experimental area.

However, WA80 results were featured adequately in a very good talk by J. Stachel, summarizing global dynamical characteristics. On the other hand, a talk by B. Jacak on transverse momentum data, that was also intended to have a broad scope, failed to hit the mark and featured only a subset of available results.

As it turned out, the conference was held at a time of significant experimental activity, both at CERN and at the AGS. This may account for some notable absences, particularly on the part of some of the major participants in the AGS program. Also (mainly) for this reason, the traveler was the only ORNL participant in the meeting. The overall attendance was good, with about 280 participants. This number is very similar to that of the Lenox meeting. One scheduling problem was that several ten-minute talks were presented in plenary sessions, often wedged between invited talks. This was not a popular scheme. Often, data already presented by the "rapporteur" were shown again, and at other times, the speaker was unable to present a coherent picture in the available ten minutes.

At a joint meeting of the International Advisory Committee and the National Organizing Committee, it was reaffirmed that the next meeting will be held in Tennessee. The traveler gave the committee two options — fall of 1991 (tentative dates September 29–October 4, 1991) or April 1992. The committee seemed to prefer the fall of 1991, and the above date was tentatively agreed to. (Possible conflicts remain to be explored through official channels.) It was also agreed to hold the meeting following the Tennessee meeting in Sweden in June 1993, with H. A. Gustafsson in charge. Some discussion took place regarding the meeting which will follow the meeting in Sweden. If the current pattern were followed, the meeting would be held in the fall of 1994 in the United States. Lawrence Berkeley Laboratory has expressed an interest in hosting the meeting. However, the German contingent (Stock, Gutbrod, and Satz) want to hold the meeting in 1995 in Germany, so that the first results from the CERN lead-beam experiments can be presented there. To complicate matters, Bikash Sinha would like to hold the meeting in 1994 in India. It was decided to make the decision regarding 1994/95 at the time of the meeting in Tennessee in 1991.

### III. Discussions with DOE Officials at CERN

Extensive discussions were held with D. L. Hendrie, D. G. Kovar, and C. R. Richardson regarding the status of WA80 and regarding future prospects. Technical details associated with the measurement of direct photons were discussed, as well as anticipated funding requests for the ORNL involvement in the CERN program. These discussions were, in the traveler's opinion, both productive and informative. The DOE officials were shown the WA80 experimental setup, which is, however, largely disassembled because of ongoing tests and calibrations. Since this report is directed to the DOE, further details of the DOE/ORNL/WA80 discussions need not be covered here.

**APPENDIX**Itinerary

5/1-2	Travel from Oak Ridge to CERN, Geneva, Switzerland
5/2-4	CERN
5/5-6	Weekend travel to Menton, France
5/7-11	Quark Matter '90 Meeting
5/12	Travel from Menton, France, to Geneva
5/13-14	CERN, discussions with DOE officials
5/15	Return travel to Oak Ridge

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