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COVER SHEET

FOR TRIP REPORTS SUBMITTED TO THE
OFFICE OF ENERGY RESEARCH

Destination(s) and Dates for
Which Trip Report Being Submitted Rome, Italy, June 22-30, 1990

Name of Traveler: Sheldon Datz

Joint Trip Report Yes

No

If so, Name of Other Traveler(s): _____

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ORNL
FOREIGN TRIP REPORT

ORNL/FTR-3663

DATE: July 12, 1990

SUBJECT: Report of Foreign Travel of Sheldon Datz, Section Head
Physics Division

TO: Alvin W. Trivelpiece

FROM: Sheldon Datz

PURPOSE: To participate in the Executive Committee meeting for the XVII International Conference on the Physics of Electronic and Atomic Collisions (ICPEAC). To visit ENEA, Department of Fusion, and present a seminar on recombination processes.

SITES
VISITED: 6/24-27/90 Castel Gandolfo, F. Gianturco
Rome, Italy
6/28-29/90 ENEA, Frascati, Italy R. Bartiromo

ABSTRACT: The traveler attended the Executive Committee meeting of the XVII International Conference on the Physics of Electronic and Atomic Collisions (ICPEAC), which will be held in Brisbane, Australia, in July 1991. He then presented a seminar on recombination processes at ENEA for the Department of Fusion in Frascati, Italy.

MASTER *db*

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CASTEL GANDOLFO
ROME, ITALY
JUNE 24-27, 1990

The principal purpose of this trip was to participate in the meetings of the Executive Committee and the Program Committee for the XVII International Conference on the Physics of Electronic and Atomic Collisions (ICPEAC), which will be held in Brisbane, Australia, in July 1991. The chairman of the International Committee is Professor F. Gianturco of the University of Rome, hence the setting of the meeting was at Castel Gandolfo, Italy. The traveler is Vice Chairman for the Brisbane conference and Chairman-elect for the 1993 Conference in Aarhus, Denmark.

This biennial conference is generally attended by ~1,000 participants. It is the principal conference in this subject area and includes electron-ion/atom/molecule collisions, ion-atom/molecule collisions, photon-ion/atom/molecule collisions, as well as collisions of clusters, exotic species, collisions in strong fields, and particle-surface collisions.

The conference extends over seven days (July 10-16, 1991) and will be flanked by seven satellite meetings.

The Executive Committee, comprised of F. Gianturco-Rome, Chairman; S. Datz-ORNL, Vice Chairman; N. Bardsley-LLNL, Secretary; and R. Morgenstern-Utrecht, Treasurer; met with the Local Committee Co-chairman (I. McCarthy-Flinders University, Adelaide and M. Standage-Brisbane) to work out local arrangements, general times, facilities, travel costs, local budgets, etc. On Monday (June 25), we were joined by some other members of the General Committee to arrange for the invited program. Present, in addition to the above-named, were the following:

T. Anderson	University of Aarhus, Denmark
A. Barányi	MSI, Stockholm, Sweden
K. Bergman	Kaiserslautern, FRG
C. Bottcher	ORNL
U. Buck	Göttingen, FRG
A. Dalgarno	Harvard University
L. Errera	University of Madrid, Spain
B. Fastrup	University of Aarhus, Denmark
D. Gauyacq	University of Paris-Sud, France
B. Gilbody	University of Belfast, UK
Y. Itikawa	University of Tsukuba, Japan
C. Joachain	University of Brussels, Belgium
N. Kobagashi	University of Tokyo
B. Mitchell	University of Western Ontario, Canada
A. Pesnelle	CEN Saclay, France
V. Remillieux	University of Lyon, France
J. Shmoenok	University of Leningrad, USSR
G. Stefani	University of Rome, Italy
V. Zoran	University of Bucharest, Rumania

The invited program of ICPEAC is determined through a very democratic and consequently complex process. There are 56 members of the General Committee representing 19 countries, divided more or less according to the participation in recent previous conferences. Each member is asked to submit suggestions for invited speakers, based upon his own judgement and consultation with colleagues in his own country. Two hundred and three such suggestions were submitted. It is then up to the Program Committee to make up a program of approximately 60-70 invited talks which represent the different subtopics in more or less proportion to the fraction of contributed papers in these areas at the previous conference. Scientific content is of greatest importance, but national representation has to be considered. (In this regard, I must comment that the U.S. is the least chauvenistic of all participants.)

The invited talks are in three categories: 1) plenary lectures, 2) review talks, and 3) progress reports. Each of the suggestions was discussed based upon aptness and merit, and after three iterations we arrived at a program which included three or four speakers who had not been on the original lists.

Two sessions of three papers each are kept open for "hot topics," i.e., things deserving invited status which have not yet been completed. One of these spots has been reserved for C. R. Vane of ORNL, who would discuss pair production and capture in ultrarelativistic collisions. M. R. Strayer, ORNL, will be invited to discuss the theory of ultrarelativistic atomic collisions.

Since this meeting will be in Australia, it was felt that some invitees would not be able to attend. Hence, a list containing some backup speakers was also prepared.

The contributed (somewhat refereed) papers will be published in extended abstract form (with figures) and will all be presented in the poster sessions. We anticipate on the order of 650 of these. These papers will be briefly refereed, and the sessions will be arranged at another meeting in March 1991 in Amsterdam.

ENEA, FRASCATI, ITALY
JUNE 28-29, 1990

On Friday, June 29, the traveler delivered a seminar on "Electron Ion Recombination Processes." The seminar, originally scheduled for the University of Rome, was moved to the ENEA (Italian Commission for Nuclear and Alternative Energy Sources) at Frascati (~25 km from Rome). My principal contact there was R. Bartiromo who is in charge of the new Frascati Tokamak Upgrade (FTU). The FTU has an impressive array of diagnostic systems. The most impressive is a bent crystal X-ray spectrometer with two-dimensional position sensitivity with a five-meter Rowland circle. This spectrometer is a prototype for one with a 20-meter

Rowland circle that is being manufactured at Frascati for use at JET (the idea being to remove the detector beyond the shielding wall). Our principal area of overlapping interest was in the atomic physics of the plasma and the diagnostic systems. Of particular interest was the role of dielectronic recombination (DR) and the effect of small electric fields on recombination rates. We had observed and reported this effect earlier. Small electric fields can have enormous effects on DR into high Rydberg states, but these states are only important for low Z , $\Delta n=0$ transitions. It turns out that such conditions are obtained at the plasma edge for carbon, for oxygen, and for some of the impurities that are intentionally injected for diagnostic purposes. Our studies may explain some of the anomalies that they have seen in their previous work.

A P P E N D I X A

ITINERARY

6/22-23/90	Travel from Oak Ridge, TN to Rome, Italy
6/24-27/90	Castel Gandolfo, Rome, Italy
6/28-29/90	ENEA, Frascati, Italy
6/30/90	Return to Oak Ridge

A P P E N D I X B

LISTING OF PERSONS CONTACTED

T. Anderson	University of Aarhus, Denmark
A. Barányi	MSI, Stockholm, Sweden
N. Bardsley	LLNL
R. Bartiromo	ENEA, Frascati, Italy
K. Bergman	Kaiserslautern, FRG
C. Bottcher	ORNL
U. Buck	Göttingen, FRG
A. Dalgarno	Harvard University
L. Errera	University of Madrid, Spain
B. Fastrup	University of Aarhus, Denmark
D. Gauyacq	University of Paris-Sud, France
F. Gianturco	Citta Universitaria, Italy
B. Gilbody	University of Belfast, UK
Y. Itikawa	University of Tsukuba, Japan
C. Joachain	University of Brussels, Belgium
N. Kobayashi	University of Tokyo
B. Mitchell	University of Western Ontario, Canada
R. Morgenstern	University of Utrecht, The Netherlands
A. Pesnelle	CEN Saclay, France
V. Remillieux	University of Lyon, France
J. Shmoenok	University of Leningrad, USSR
G. Stefani	University of Rome, Italy
V. Zoran	University of Bucharest, Rumania

A P P E N D I X C

Literature Acquired

"Spectrum of Hydrogenlike Chromium from the Frascati Tokamak,"
R. Bartiromo, F. Bombarda, and R. Giannella, Phys. Rev. A 40, 7387 (1989).

"Frascati Tokamak Upgrade," ENEA Report (Dec. 1988).

"1987 Annual Report," Fusion Department of the Italian Commission for
Nuclear and Alternative Energy Sources/Frascati Energy Research Center.