Impact Ionization

23-27 July 1973, Englefield Green, Surrey

A Europhysics Study Conference on impact ionization was organized at Royal Holloway College, Surrey on 23-27 July 1973 by the Atomic Physics Division of EPS. This conference was designed as a small specialist discussion meeting in connection with the international conference on the physics of electronic and atomic collisions held in Belgrade in the previous week. Nearly 60 people from various parts of the world took part. The discussion was confined to ionization of atoms (or positive ions) and molecules by electron and proton impact, with the emphasis on the electron-atom problem.

In recent years, quite a lot of progress has been made in improving the energy resolution for measurements of total ionization cross-sections. Also, the development of coincidence techniques has enabled measurements to be carried out of differential cross-sections as a function of ejected electron energy and angular positions of the outgoing particles. Erhardt reviewed the current situation in experiments on atoms at lower impact energies and de Heer gave a review of the large amount of high energy data on total cross-sections. Contributions from inner shell ionization were discussed and Fiquet-Fayard and Hasted led discussions on autoionization effects and the ionization of molecules respectively. Further discussion sessions were held on crossed beam techniques (leader, Dolder) and on the measurement of differential cross-sections (leaders, Beaty and Willmore).

The general theory of ionizing collisions was given by Rudge and Temkin, and Peach and Inokuti talked about Born and Bethe-Born calculations. While the Born approximation has been proved to give good results for total cross-sections at high impact energies, its deficiencies become apparent when differential cross-sections are studied. It was clear that several theoreticians at the meeting have been stimulated by the differential cross-section measurements now available to try to develop more exact methods, which can be applied in a lower impact energy region, and a discussion session on the calculation of differential cross-sections was led by McDowell. The problem is certainly a challenge to theoreticians ; so far, it has not even been established what the threshold law is for the total ionization cross-section.

The conference was well organised and was run in an informal manner so that there was plenty of time for spontaneous discussion. This was much appreciated by the participants, who found it a very useful meeting. Much appreciated also was the hospitality of Royal Holloway College and its setting in a very attractive part of Surrey.

G. Peach

Controlled Fusion and Plasma Physics

30 July - 3 August 1973, Moscow

The Plasma Physics Division of EPS held the Sixth European Conference on Controlled Fusion and Plasma Physics at the Lomonosov State University in Moscow. More than 500 participants from 21 countries attended the congress. The size of the Moscow meeting was, hence, by about 50 per cent, larger than that of the last conference of the series, held a year ago at Grenoble (France) — because of a particularly strong participation of Soviet plasma physicists. As in previous years, the Conference again also attracted a substantial number (about 60) of specialists from non-European countries.

The Congress started with a commemoration of Academician L.A. Artsimovich who had been, until his untimely death, the President of its Organizing Committee and a Member of the Paper Selection and Programme Committee. His contributions to the discussions, often critical and always focussing on the essential point, were deeply missed at the Conference.

The scientific programme included 16 invited papers, presented during plenary sessions, and about 150 contributed papers, which were read in three parallel sessions. The selection of the papers and the organization of the programme was made by the International Paper Selection and Programme Committee whose members were L.A. Artsimovich (USSR), T. Consoli (France), B. Kadomtsev (USSR), V. Kopecky (Czechoslovakia), E. Kusnetsov (USSR), D. Pfirsch (German Dem. Rep.), M. Rabinovich (USSR), P. Reynolds (UK), and V. Shafranov (USSR). Three informal discussion sessions, dedicated to "Tokamaks", "Open Traps", and "Lasers and Relativistic Electron Beams", respectively, were also held during the Conference. Furthermore, opportunities were offered to visit the Moscow plasma physics laboratories. Visits to the laboratories at Leningrad, Kharkov, Sukhumi and Novosibirsk were organized after the meeting.

In the invited lectures the following subjects were treated :

Advances in the Tomakak programme *(B.B. Kadomtsev,* Moscow)

Experiments on the containment of collisional plasma in mirror traps (*M.S. Ioffe,* Moscow)

Relativistic electron beams *(R. Sudan, Ithaca)*

Tokamaks with non-circular cross-section (*G. Laval,* Paris)

Electron beam - plasma interaction (*Ya. B. Fainberg,* Kharkov)

The Scyllac programme (*W.E. Quinn,* Los Alamos)

The world's energy needs and controlled thermonuclear fusion (*R. Carruthers,* Culham)

Theory and experiments in laser-driven fusion (*K.A. Brueckner,* Ann Arbor)

High-β plasmas (*W. Lotz,* Garching)

First results of the TFR Tokamak experiments (*P.H. Rebut,* Fontenay-aux-Roses)

Plasma diffusion in toroidal systems (*R.J. Bickerton,* Culham)

High- frequency heating and the problem of plasma ignition in low-β tori (*E. Canabbio,* Grenoble)

Interaction between plasma and intense electromagnetic radiation (*R.Z. Sagdeev,* Moscow)

Non-ohmic plasma heating (*H.P. Furth,* Princeton)

Controlled thermonuclear research in dense plasma devices (*A.M. Budker,* Novosibirsk)

Plasma accelerators *(A.I. Morosov,* Moscow).

The conference was marked by a considerable shift of emphasis from more fundamental research to work directly connected with the problems of controlled thermonuclear fusion. Within the framework of research on magnetic plasma confinement, the relative weight of the activity in the field of Tokamak devices has further increased. Encouraging results on