Second European Conference of Cosmic Plasma Physics

Culham, UK, 1-5 July 1974

In the first week of July 1974 the second European Conference on Cosmic Plasma Physics was held at the UKAEA Culham Laboratories. It followed the first of these conferences which had been held 3 years ago at Frascati. It was jointly sponsored by the EPS (through their Astronomy and Astrophysics and Plasma Physics Divisions) and the Institute of Physics of London.

A great deal of help was, however, given, first and foremost, by the Culham Laboratories, both by putting at our disposal their excellent and smoothly running conference bureau and by giving financial support. Generous financial support was also given by the Royal Society and the Science Research Council.

Cosmic plasma physics is now a rapidly growing field of research. It was clear from the papers given at the conference that a great deal of progress had been made since the Frascati conference and also that there is an increasing interest in the topics covered by the conference. The conference was attended by more than 150 people. Unfortunately, there were no representatives from the USSR and, in fact, very few from other East European countries. Invitations had been sent to four leading Soviet plasma physicists and astrophysicists to give invited papers but none of these scientists were able to come. There were thirteen invited papers and more than sixty contributed papers. In view of the large number of contributed papers in a few cases parallel sessions were necessary.

The main emphasis in both contributed and invited papers was on the application of plasma physics to astrophysics — in which we shall include for the purpose of this report ionospheric physics — and there were few papers on laboratory plasma physics : only one invited paper and ten contributed papers dealt exclusively with that topic. This is a change from the situation at the Frascati conference and may indicate that astrophysicists are now using plasma physics to such an extent that they are able and wish to fill the programme of a conference.

The conference started with a talk by the doyen of plasma astrophysicists, Alfvén who together with Coppi, who discussed laboratory plasma observations relevant to astrophysical phenomena, set the scene and the tone for the remainder of the conference.

The other invited talks dealt with cosmic plasma phenomena. The nearest home was Ratcliffe who gave a talk on ionospheric whistlers, illustrated by sound tracks of whistlers including the « dawn chorus » which was compared with a real dawn chorus recorded at his home. Schindler dealt with geomagnetic substroms in the earth's magnetosphere and Pellat with the interplanetary plasma and the influence of solar bursts on this plasma. The conference was very fortunate in having Ogilvie report on the measurements made by Mariner 10 in February and March of plasma conditions near Venus and Mercury. Finally, as far as the solar system was concerned, Wilson discussed the solar corona and Kuperus the evolution of solar magnetic fields. From the list of contributed papers it is clear that solar plasma physics, including solar wind problems, occupy a very large fraction of cosmic plasma physics. There were about 30 papers covering these topics which were more or less evenly divided between solar phenomena and processes occurring elsewhere in the solar system.

The remaining five invited papers were devoted to those regions of the Universe which lie outside the solar system. Wentzel discussed various problems connected with cosmic rays, but this topic did not attract any contributed papers. Omnes dealt with matter-antimatter cosmologies and showed how galaxy formation in such models could be likened to a phase transition. From his talk it became clear that this topic is still in quite a state of flux. There was one contributed paper dealing with this topic. Sturrock discussed one possible model for pulsar emission. Pulsars, though not being quite as much in the centre of the stage as a few years ago (most people are by now disillusioned), are still discussed extensively and both the physics of the pulsar magnetosphere and the influence of the strong electromagnetic waves produced by the rotating magnetic dipole on the surrounding supernova remnant were the subject of contributed papers. Rees gave a comprehensive review of various radio-source properties, especially those of the double sources, and discussed possible models. There were several contributed papers dealing with radio- and X-ray-sources. Finally ter Haar reviewed the properties of the astrophysical plasma which may produce both power-law relativistic electron distributions and powerful radiation and which were called plasma turbulent reactors by Tsytovich. A couple of contributed papers also reported on recent developments of plasma turbulent reactor theory.

The plasma physicists present throught that the conference was dominated by astrophysicists and astrophysicists felt that the majority of people present were plasma physicists : the mixture was probably about the correct one. From the reactions from various participants one got the impression that the level and coverage of the conference was about the right one for the present epoch and also that one may expect considerable progress in many of the fields covered in this meeting within the foreseeable future. The general opinion seemed to be it would be a good thing to have another of these conferences in about three years time.

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