GENERAL DISCUSSION ON SUPERCONDUCTING PULSED MAGNETS

by participants in this session.

The discussion started on the aperture and maximum field which an optimized accelerator magnet should have.

It was clear to everyone that all effort should be made to reduce the magnet aperture and corresponding stored energy as much as possible. There was only a slight discrepancy of opinions, the suggested overall aperture varying between 5 and 8cm. The useful region was estimated to be approximately 80% of the total aperture. The optimistic value of 5 cm will depend on improvement in ejection and orbit handling. But ways could be found for reducing aperture radius in a completely new machine design, for example, by using high β insertions.

However, most of the designs being considered currently are along the lines of conversion or extension of existing machines. It is worth remarking that the constraints of this situation may prevent taking full advantage of these possible improvements.

Concerning the maximum field, some of the speakers thought that it would be advisable to aim for high fields (6T), again because of considerations of a superconducting accelerator being built in the tunnel of an existing machine in which case high field would be required to obtain the highest energy particles.

Further discussion followed on energy storage and transfer, introduced by P.F. Smith who gave a brief report on a multi-stage energy-transfer scheme more fully described in the first paper included in these Proceedings, immediately after this discussion.

In reply to a question, Smith pointed out :

a) The cost advantages of his scheme, with respect to conventional rotating machines, depend on the amount of stored energy and are probably more important for high energies.

b) The total stored energy in the scheme is typically four times the energy stored in the magnet.

c) To a first approximation, the ratio between costs of power supply and accelerator magnet is 0.15-0.2.

The discussion ended with comments by H. Brechna on long-range performance of superconducting magnets, mentioning particularly fatigue properties and radiation effects in cryogenic materials and superconductors. These comments were based on work that is described more fully in the second and third papers included in these Proceedings, following this discussion.