11. Optical requirements

None. The event can be reconstructed on the face of a scope for visual observation of the more complicated events.

12. Features

a) Automatic digitization of information.

b) Chambers are not limited to a planar geometry and can be put into conventional magnets.

c) There is usually a minimum time, ~300 μs, before any sound signal arrives at the detectors. This time interval could be used by a computer on-line to digest other information, and, for instance, provide a go-no-go gating of a somewhat more complicated nature than the usual counter trigger. Thus some selection and filtering can be made before the need to record and store the same information and so reduce the storage requirements.

13. Present status

One experiment completed, several in progress.

III. COMPARISON CHART FOR DIGITIZED DISCHARGE PLANES

(Wire Array)

D. Miller

1. Spatial resolution

Error in locating centre of discharge $\leq$ half the spacing between wires - error typically 0.5 mm.

2. Present maximum size

65 × 65 cm (512 elements).

3. Construction methods

for plane

a) Wind wires over frame using lathe - 2 man-hours/plane

b) Stretch foils over frame - 6 man-hours/plane

c) Etch electrodes - commercial

for memory

a) Dip solder write lines - 1 man-hour/plane

b) Memory plane - commercial $\frac{1}{2}$ Sf/bit

4. Multiple track capability

10 per gap observed.

5. Sensitivity to specific ionization

Given by number of adjacent cores set.

6. Sensitive time

0.2 to 0.5 μs.

7. Recovery time (discharge planes)

0.2 to 0.5 ms (smaller in the three electrode unit)

8. Reading time

Can clear memory of several hundred spark locations during the recovery time.

9. Optical requirements

None.

10. Electronic requirements

Scaler-decoder-read current sources parallel to series converter. - commercial modules $15,000 - $20,000 signifiant design time

11. Permanent data storage

Magnetic tape.

12. Computer requirements

Programme interrupt feature is useful for on-line analysis.

13. Special programme requirements

Must locate spark centre in each gap.

14. Special features

Short recovery time, mechanical flexibility, simple analogue display, can be used as a logical element.

15. Special problems

Can only resolve multiple track ambiguity with a third discharge plane or a three electrode unit.

16. Present status

Final development stages; operating in test beams.

Addendum to III by M.J. Neumann

The secondary discharge spark chamber should have a recovery time in the order of microseconds or better, because of the very low current discharges, the increased rôle of surface recombination and the fact that the distributed and isolated charge-storage principle (every wire has its own storage capacitor and bleeder) - permits triggering of the spark chamber immediately after breakdown, and only the wires involved in the previous discharge are incapacitated within their own dead time.

IV. PROPERTIES OF CONVENTIONAL CAMERA-FILM DATA ACQUISITION SYSTEMS WITH NARROW-GAP SPARK CHAMBERS

A. Roberts

1. Spatial resolution

Limited only by the structure of the spark itself. The estimated range of resolution is about 0.25 to 2 mm.

2. Distinguishable elements

Again limited only by the spark structure.

3. Time resolution

Dead time from 1 to 10 ms, depending on the conditions of operation; even shorter recovery times can be obtained if desired. Data storage