CALIBRATION OF SPARK CHAMBERS WITH LIGHT

G. Poelz^{*)} and K. Springer^{**)}

CERN, Geneva, Switzerland,
Max-Planck-Institut für Kernphysik, Heidelberg, Germany

Geneva - 17 April 1968

(Submitted to Review of Scientific Instruments)

^{*)} On leave of absence from the Max-Planck-Institut für Kernphysik, Heidelberg, Germany.

^{**)} Visitor to CERN from the Max-Planck-Institut für Kernphysik, Heidelberg, Germany.

CALIBRATION OF SPARK CHAMBERS WITH LIGHT

G. Poelz^{*)} and K. Springer^{**)}

CERN, Geneva, Switzerland,

Max-Planck-Institut für Kernphysik, Heidelberg, Germany

The generation of artificial sparks by pulsed light, in a spark chamber with transparent electrodes, has proved to be successful for testing and calibrating the chambers. Normally, corona discharges as light sources, e.g. between an earthed needle and the high-voltage electrode of the chamber¹⁾ or small spark gaps²⁾, were used. Neither of these methods are very reliable if the spark chamber is covered, as is usual, by polyester foils (Hostaphan, Mylar) separating it from the light source. We found that this drawback is overcome if polyolefine foils are used, these being more transparent for the passage of ultra-violet light. Polypropylene [Trespaphan^{***)}] with a thickness of 0.015 mm showed the desired properties also with respect to the solidity.

The electrodes of our spark chamber consisted of wire meshes with a transparency of 82%, and were spaced 0.5 mm apart. The filling gas was 70% Ne and 30% He at atmospheric pressure.

The light produced by a spark gap was collimated to a beam of about 0.15 mm diameter, and was triggered simultaneously with the chamber.

The resolution thus obtained with an inductive localization³⁾ of the spark is shown in Fig. 1, where the light pulser had fired the spark chamber at two different spots, 24 mm apart, one after the other. The full half-width is less than 0.3 mm.

If several of such spark chambers are to be used in a hodoscope, they should be separated by foils of Hostaphan or Mylar to prevent the production of sparks in one chamber by the spark light of another.

*) On leave of absence from the Max-Planck-Institut für Kernphysik, Heidelberg, Germany.

**) Visitor to CERN from the Max-Planck-Institut für Kernphysik, Heidelberg, Germany.

***) Kalle und Co., Wiesbaden, Germany.

REFERENCES

- 1) G. Charpak, J. Favier and L. Massonnet, Proc. Int. Conf. on Instrumentation for High-Energy Physics 3, Stanford (1966) (Washington Atomic Energy Commission, 1966), p. 3.
- 2) J. Jeanjean, J. Lefrançois and J. Perez-y-Jorba, Nucl. Instrum. Methods 41, 100 (1966).
- 3) G. Foelz and K. Springer, Z. Naturforsch. 21a, 1188 (1966).
H. Daniel, G. Foelz and K. Springer, Arkiv Fysik 36, 163 (1967).

Figure caption

Resolution obtained by measuring one spark coordinate when the chamber is fired by a light pulser at two different spots. L is the pulse height of the signal depending from the coordinates of the spark.