E212: Properties of Elementary Particles

Bence Mitlasóczki*and Benoît Scholtes†
Rheinische-Friedrich-Wilhelms Universität Bonn

March 22, 2018

Abstract goes here

Distance (cm):	F21 - F22	G41 - G42
calculated	23.9951	32.1905
measured	28.2 ± 0.1	37.7 ± 0.1
V_{F}, V_{G}	0.85089 ± 0.00302	0.85386 ± 0.00226
V_a	0.85238 ± 0.00264	

1 Introduction

Introduction text

2 Theory

3 Experimental setup

4 Procedure

4.1 Magnification

We determined the magnification of the photographs by comparing the known coordinates of marks on the two glass planes with the measured distances and assuming the beam passes through the middle of the bubble chamber.[3] To get the true depth at which the beams were passing through, we used the "stereo-shift" method in 23 different cases. Viewing the same event from two different cameras, we measured the displacement s_G of the point G41 and s_A of an easily identifiable event in the path of the beam, both with an error of ± 0.1 cm. From the data gathered, we discovered the depth to be at

$$\frac{s_A}{s_B} = 0.570 \pm 0.011, \tag{1}$$

of the total depth, which is in disagreement with our assumption for the magnification before, namely that the beam passes through at 0.5 depth. This is an important source of systematical error when measuring length on the photo and reconstructing real distances from it.

*s6bemitl@uni-bonn.de
†s6bescho@uni-bonn.de

5 Conclusion

References

[1] Unspecified author, *Advanced Laboratory Course (physics601): Description of Experiments* (University of Bonn, 2018).

[2] W. R. Leo, *Techniques for Nuclear and Particle Physics Experiments* (Springer-Verlag, 1987), p. 305.

[3] G. Seul, *Properties of elementary particles* (University of Bonn, 2009).