California Science Center

CALIFORNIA STATE SCIENCE FAIR

2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.)

Peter C Cameron

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)

The Magnetic Accelerator

Science Fair Use Only

S0102

Division

_ Junior (6-8) _X_ Senior (9-12)

Preferred Category (See page 5 for descriptions.)

1 - Applied Mechanics/ Structures & Mechanisms/ Manufacturing

Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.)

Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.

Objective: There were two major objectives for this science fair project. The first objective was to create a magnetic coil gun which had the capability to launch objects, and the second was to determine how the starting position of the projectiles related to the coils affected the distance traveled.

Materials and Methods: First, I constructed the coil gun from a step-down transformer, one resistor, a 25,000 mf capacitor, one bridge rectifier, one heavy-duty toggle switch, and one momentary SPST switch. To test the gun, I used five different sized metal projectiles, each in an increment of 10 mm in length. After creating the projectiles, I would push each a certain distance inside of the coils in my gun and would charge the capacitor, releasing the charge once it reached 11.5 volts. After launch, I marked the landing spot of each shot, and then measured the distance traveled.

Results: I found that the projectiles traveled the farthest and fastest when they were located 5 mm inside of the coils, regardless of length. The peak velocity which I reached was 1.79 m/s, and it was attained by the 50 mm metal projectile.

Summary Statement (In one sentence, state what your project is about.)

The effect of different sized projectiles and different starting positions of projectiles in a magnetic accelerator.

Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.

Father helped me locate and mark positive first hits on my test firings.