



# CALIFORNIA STATE SCIENCE FAIR

## 2006 PROJECT SUMMARY

Name(s) <b>David Chu; Sol Moon; Tim Yaopruke</b>	Project Number <b>J0708</b>
<b>Project Title</b> <b>Electricity Generation in Reversed Faraday Setup: Effect of Magnet Geometry?</b>	
<b>Objectives/Goals</b> The objectives are to answer the questions regarding electricity generation in "reverse"Faraday's setup: 1)Does the reverse of Faraday's setup generate electriciy? Spinning a magnet versus spinnin a coil? 2)How will changes in the geometry of magnets in a generator setup, change the amount of eregy produced:serial, parallel, or ring?	<b>Abstract</b>  
<b>Methods/Materials</b> To build our generator,we used 2 in. wide PVC Pipe to hold up our coil. We then wrapped about 1000 yards of copper wire around the center of the pipe. We built the different magnet arrangements by attaching 4 strong neodymiun magnets in the parallel, serial and two different ring formations. Then, we spun the magnets 20 times per configuration with a drill. We recorded an alternate current generated with a digital ammmeter. Materials used include 8 Neodymium Magnets, Digital Ammeter, >1000 yards of copper wire, 3 ball bearings, 16 in. of 2 in. wide PVC PIpe, 3'6 wooden rod, 2 ft. x 1 in. of wooden pole, Epoxy, 18V electric drill.	
<b>Results</b> 1)Reverse of Faraday's setup is proven to generate electricity. The faster the magnet spins, the more current was generated qualitatively. 2)It turns out that the configuration of the magnets does affect the current generated. The greatest mean current was made by the serial form at $1031\mu\text{A}$ . The average current for the parallel formation was $165\mu\text{A}$ . We did not receive much power in our Ring Formation #1. The average was only $20\mu\text{A}$ . Ring formation #2 was also less in power averaging $650\mu\text{A}$ . The serial formation did generate electricity, which was greater than all the others.	
<b>Conclusions/Discussion</b> We have showed that spinning the magnets inside of a stationary coil, reverse of Faraday's setup, would generate electricity, the faster the magnet spins, the more current was generated. For the magnet geometry, the serial pattern worked the best in generating an electrical current. The attraction of the three magnets all lined up created a stronger magnetic field around the coil, more than that of the other configurations. Regarding the efficiency, we think that we lost a lot of energy due to friction in the ball bearings and resistance of the copper coils, as it's resistance was 77.5 ohms. We have learned a lot about Michael Faraday's work from 1821 ~ 1831. This is especially intriguing as to see how we could exploit this finding to create more energy with the same amount of force.	
<b>Summary Statement</b> Electricity is proven to be generated in reversed Faraday's setup, and how the arrangement of magnets can affect the current generated.	
<b>Help Received</b> Neighbor helped with comments on the project; Dad bought and brought supplies, supervised cutting of wood PVC pipe, and drilling.	