CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
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Project Number
S1601

Project Title
Gauging Black Hole Behavior: Modeling AdS/CFT Correspondence through a Particle Accelerator

Abstract

Objectives/Goals
In this project, electrons were collided to try to model black hole behavior. More specifically, varying magnetic flux densities resulting from these collisions were used to model the varying flux behavior, caused by event horizon perturbations resulting from AdS/CFT Correspondence.

Methods/Materials
One particle accelerator was constructed to collide electrons. The particle accelerator consisted of three DC Power Supplies, one PVC tube (.1 cm thickness), copper wire, a magnetic flux sensor, collision disc (a metallic disc), four electromagnets, an aluminum plate, an ultraviolet laser, and a charge oscillator. A polycarbonate case was also constructed so that a partial vacuum could be maintained. UV laser shone upon aluminum allowed for a source of electrons. Electrons (negatively charged) accelerated through the positively charged tube and collided at the collision site, the metallic disc.

Results
Four trials of particle collisions were made. Each collision, as predicted, produced a vary magnetic flux density. The trials were graphed (time vs. magnetic flux density). These graphs were compared with known varying fluxes of black holes, obtained from NASA's CGRO satellite.

Conclusions/Discussion
Known data about varying fluxes in black holes, obtained from NASA's CGRO satellite, was compared with data obtained through the particle accelerator. The close similarity between the two sources of data indicated that particle collisions can, indeed, be used as models for varying flux black hole behavior (AdS/CFT Correspondence).

Summary Statement
A particle accelerator was built to model specific black hole behavior.

Help Received
Used lab equipment and engineering facility of school.