



California Science Center  
**CALIFORNIA STATE SCIENCE FAIR**  
**2001 PROJECT SUMMARY**

<b>Your Name</b> (List all student names if multiple authors.) <b>Faizan Ahmed; Sameer Ahmed; Benjamin Hsu</b>	<b>Science Fair Use Only</b>  <h1 style="margin: 0;">S1401</h1>
<b>Project Title</b> (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) <b>The Effect of a Magnetic Field on the Paths of Cosmic Rays</b>	<b>Division</b> _ Junior (6-8) <u>X</u> Senior (9-12)
<b>Preferred Category</b> (See page 5 for descriptions.) <b>14 - Physics &amp; Astronomy</b>	
<b>Abstract</b> (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.	
<p><b>Objective:</b> The objective of the project is to examine the path and decomposition of cosmic rays and thus determine the identity of these subatomic particles. By determining the identity of such cosmic rays, the understanding of subatomic particles gives us added understanding of the inner workings of the atom and the surrounding universe.</p> <p><b>Methods:</b> A diffusion cloud chamber/cosmic ray detector was first built. Then, a toroid was constructed. The diffusion cloud chamber was operated without the presence of a magnetic field. Running the apparatus without the magnetic field provided the control data. By introducing a constant magnetic field (via the toroid), the particles of positive, negative, or neutral polarity were separated. The various types of subatomic particles were determined by analyzing the paths of decomposing subatomic particles; furthermore, the magnetic field allowed for the identification of polarity of the different subatomic particles.</p> <p><b>Results:</b> When the magnetic field was not operating, the thin, straight paths of the cosmic rays were found throughout the diffusion cloud chamber. By applying the magnetic field, most particles observed deviated from their normal straight paths and began moving in curved and spiral patterns.</p> <p><b>Conclusion:</b> Through this experiment, it was determined that the usage of a cloud chamber and uniform magnetic field could be used to determine various types of subatomic particles in cosmic rays.</p>	
<b>Summary Statement</b> (In one sentence, state what your project is about.) The project utilizes the cloud chamber and a continuous magnetic field to identify different subatomic particles.	
<b>Help Received in Doing Project</b> (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.	