IPRO 303 - Designing a State-of-the-Art Exhibit for the Atrium at Fermilab
Spring 2005

Objective

Over the next few years, the global scientific community will be deciding on the site for the International Linear Collider (ILC). The ILC will be the next great step in particle physics, and there will only be one in the world. The United States would like to host the ILC and Fermi National Accelerator Laboratory in Illinois is a very likely candidate to support this technology. Many important politicians and scientists will be visiting Fermilab during this period of political negotiation and site evaluation.

The team's goal is to design an exhibit for the atrium in Wilson Hall at Fermilab that conveys the scale and importance of scientific research, the value of science education, and the intersections of art and science for both a scientific and non-scientific audience. The exhibit will not only be open to the Fermilab staff and general public, but also to visiting dignitaries and politicians.

Basic Organization and Tasks

After extensive research and interdisciplinary brainstorming, groups were formed to work on the three main ideas for an exhibit. The three groups are Confluence, Interstitium, and The Visible Collision.

The goal of Confluence is to make visible the collision and annihilation of particles, and to utilize flow visualization techniques to create that effect on a macroscopic scale.

The goal of Interstitium is to draw visible parallels of different scales through a network of reflecting or bouncing lines with the ability to trace any point's path back to an origin. The group investigated the idea of using twenty miles of continuous length, reflecting the approximate length of the proposed ILC.

The goal of The Visible Collision is to make invisible particle collisions visible to everyone through the medium of everyday objects. The group has investigated different modes of user interaction with video displays.

Accomplishments

IPRO 303 was able to develop and model unique concepts and designs for each of the three groups. For the implementation of Confluence, a tube will be filled with rheoscopic fluid and stirred in opposite directions at the ends, causing the currents to cancel in the center. A digital model showing the idea in the atrium space and renderings of the proposed installation were created. For Interstitium, models were developed to portray the essence of the idea of a network of reflecting and bouncing lines to visualize the design in the space of the atrium.

The design was prototyped at Fermilab and images of the proposal were created. The Visible Collision group produced a video of collisions of everyday objects as a sample of using video as a means of presenting the idea of collisions. Display kiosks were designed to display these videos. The kiosk installations were modeled in the atrium space, and the video was played for a variety of people to receive feedback.

The team as a whole will include all of these proposal ideas in both a formal written document and an oral presentation for both Fermilab and potential financers.

Critical Barriers and Obstacles

The IPRO 303 team had a number of obstacles to overcome. First, the project design had very few constraints, and it was difficult to distill a wide array of ideas into a few concrete proposals. Also, physically modeling the atrium space proved to be quite a challenge. The group was able to overcome this challenge by developing a digital model and redesigning the physical model with new materials.

Another obstacle that the team overcame was that it was difficult to stick to the project goal of creating a solid proposal and not implementing this proposal. It is much more time efficient to develop a good project plan than it is to spend too much time prototyping ideas at a very specific level. Finally, having to meet as an entire group at the distant location of Fermilab was a minor challenge in itself.

Future Work

The next step is to propose the design ideas to Fermilab and pursue funding options for the development and construction of the installation. With financial backing, a core student group will continue to serve as consultants on the project implementation.

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