BeamCats 2018

Students: Aarushi Taneja, Ashish Tutakne, Charvie Yadav, Sana Singru, Sae Joon Cheon, Yash Karan

Advisors: Mr. Hill, Mr. Dickinson
Who Are We?
The Philippines
International School Manila
Astronomy Club
OUR MEMBERS
Sana & Sae

Joon
Aarushi & Charvie
Ashish & Yash
OUR PROPOSAL
Finding effective safe cancer therapy has been an issue of priority in the medical community.

Two out of five individuals get diagnosed with cancer at least once in their lifetime.

The most common treatment options available today are chemotherapy, surgery and radiation therapy. These methods of treatment come with their own side-effects.
Last Year’s Proposal

- Based off of study done in 1970s on pion therapy (abandoned)
- It had been recently discovered that using a heavy metal would increase the efficiency of pion therapy
- A calorimeter was used to measure the energies of nuclear fragments and determine their effectiveness
This Year’s Proposal: The Improvements

- We came up with ways of quantifying our results using a bragg peak for pion beam therapy.
- Instead of simply measuring the amount of energy the isolated negative pion beam produced, we tried to emulate skin tissue using graphite oxide.
- **Independent Variables**: Depth and Initial Energy
- **Dependent Variable**: Output Energy
Why Graphite Oxide?

- Non-biological:
  - Feasible inside the accelerator.

- Composition:
  - 50.1% Carbon
  - 44.81% Oxygen
  - 2.69% Hydrogen
Overview of This Year’s Proposal

- Pions being light particles, have a high scattering potential. Thus effectively destroy cancerous cells.
- Negative pions, when captured by hydrogen atoms, replace the electron in its orbit.
- When this atom gets close to a heavier element like carbon, oxygen, or nitrogen in the tissue, the pion is transferred to its nucleus due to lower final binding energy.
- The pion is absorbed by the nucleus due to strong attraction, in a time that is shorter than its lifetime.
- 140 MeV of energy is released.
What have we done so far?
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