Development of a Parity Violation Experiment for Undergraduate Laboratories



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What is a parity transformation?



1

History and Motivation

- Parity violation proposed by Lee and Yang (1956)
 - Awarded Nobel Prize
- Wu is first to experimentally verify prediction (1957)
- Experiment not part of undergraduate curriculum
- Goal is to develop low cost procedure



 β^- Decay of ⁶⁰Co



Mirror transformation of Beta Particle



Consequences of Conservation Laws



Houghton College Design







Coincidence Electronics



Timing Resolution



Time

²⁰⁷Bi Beta Spectrum

⁶⁰Co Beta Spectrum



Singles Gamma Spectrum (Nal Detector)



Energy

Gamma Spectrum (BGO Detector)



Coincidence Spectrum through Magnet



Future Work

- Make hotter source
- Use thinner magnet
- Modify data collection

Wu's Landmark Experiment





Timing Resolution



Without Cuts

With Cuts