

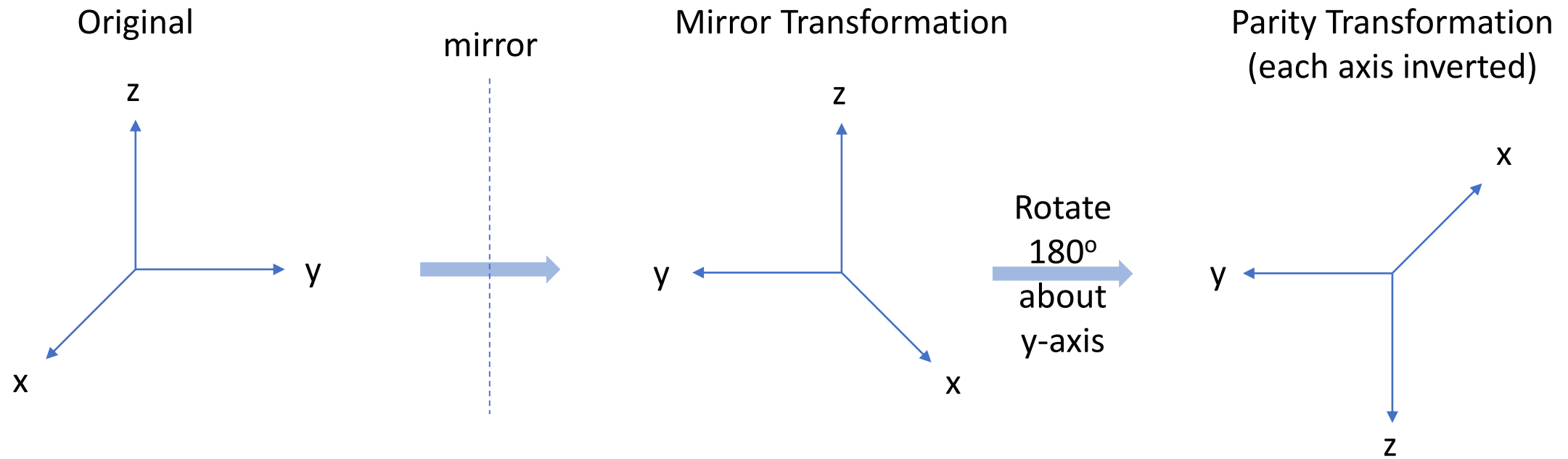


HOUGHTON  
UNIVERSITY

# A Parity Violation Transmission Experiment for Undergraduate Laboratories

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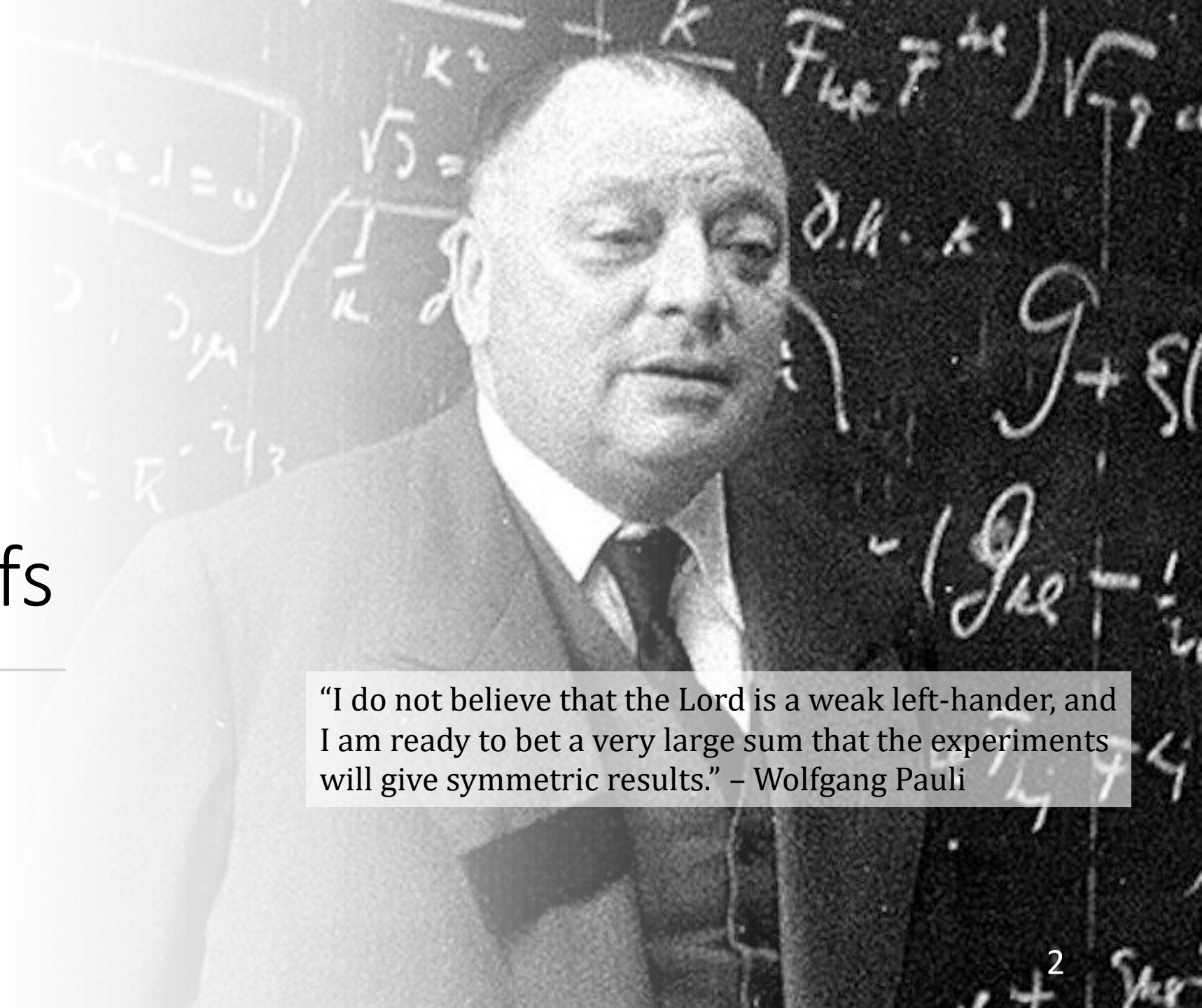
# What is a Parity Transformation?



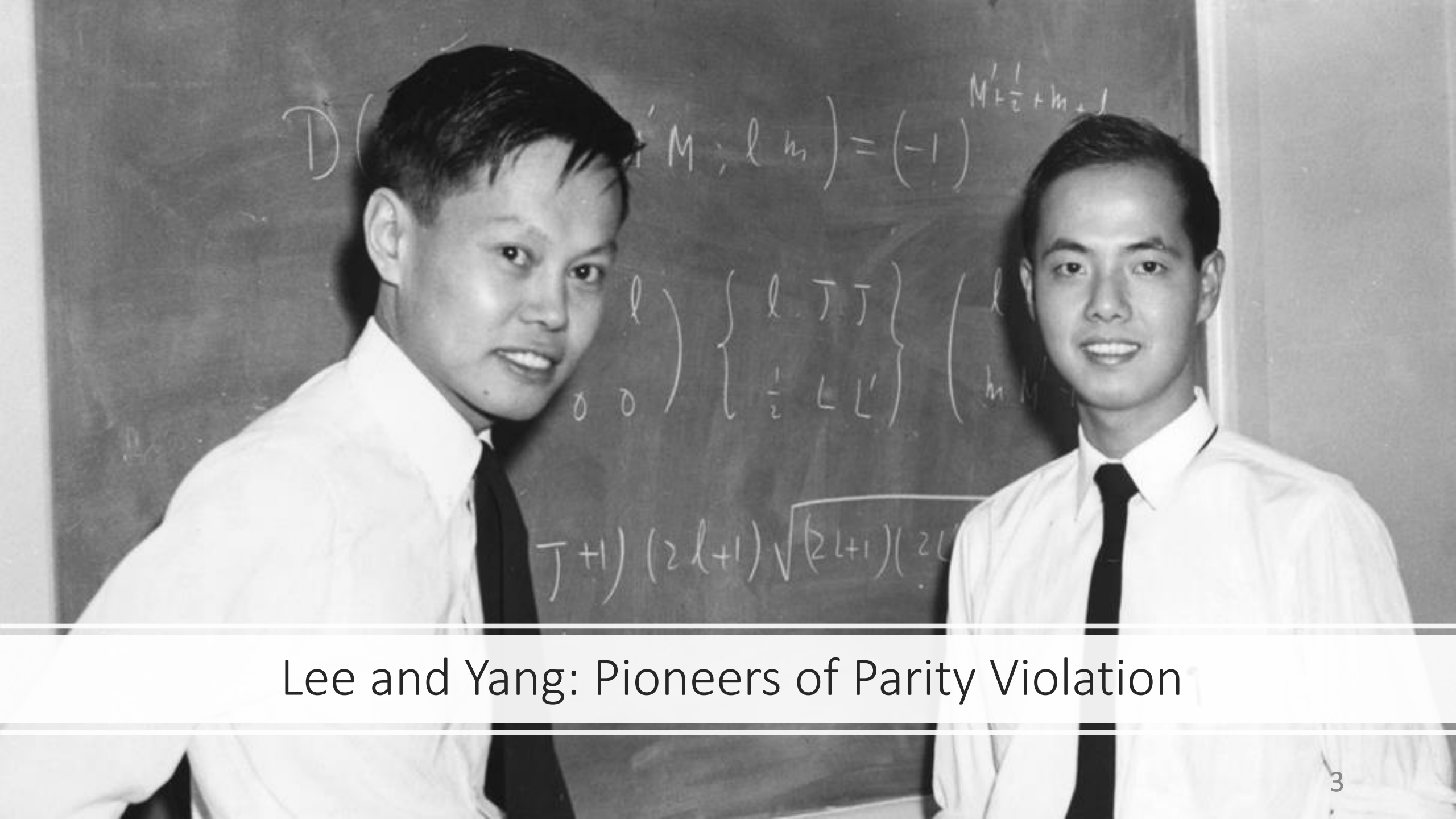


# Previous Beliefs

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“I do not believe that the Lord is a weak left-hander, and I am ready to bet a very large sum that the experiments will give symmetric results.” – Wolfgang Pauli

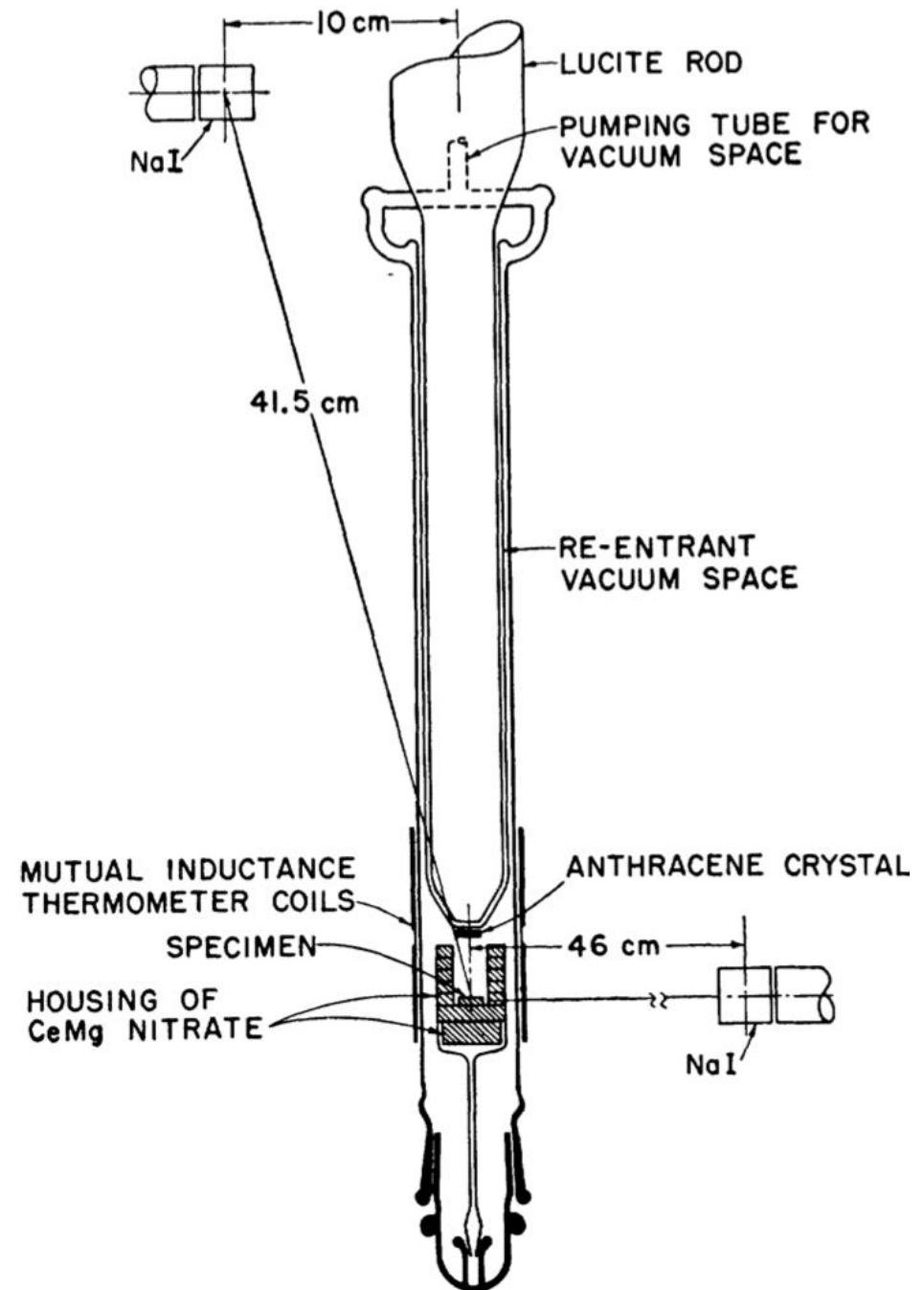


Lee and Yang: Pioneers of Parity Violation

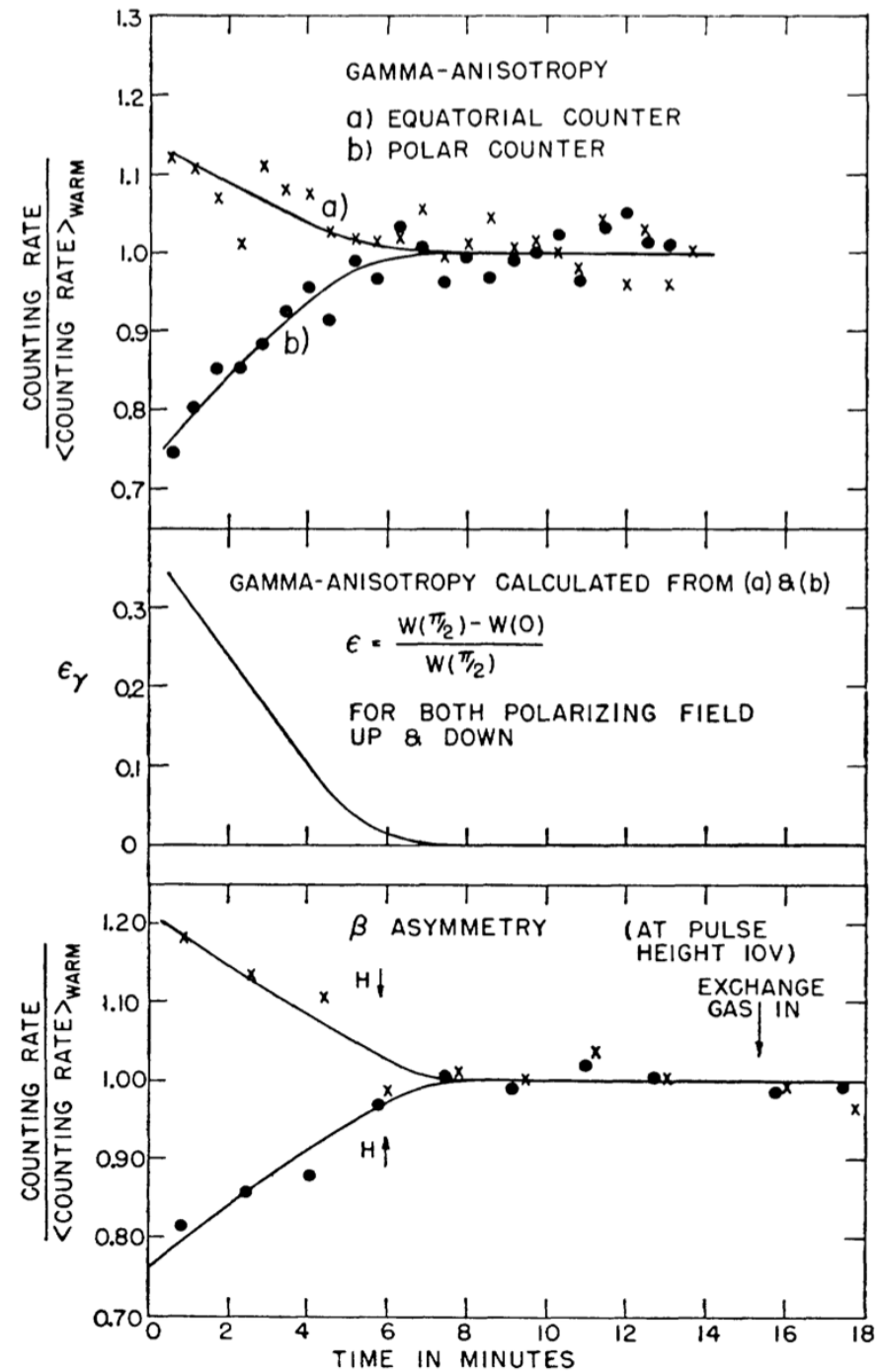


## Chien Shiung Wu: The First Parity Violation Experiment

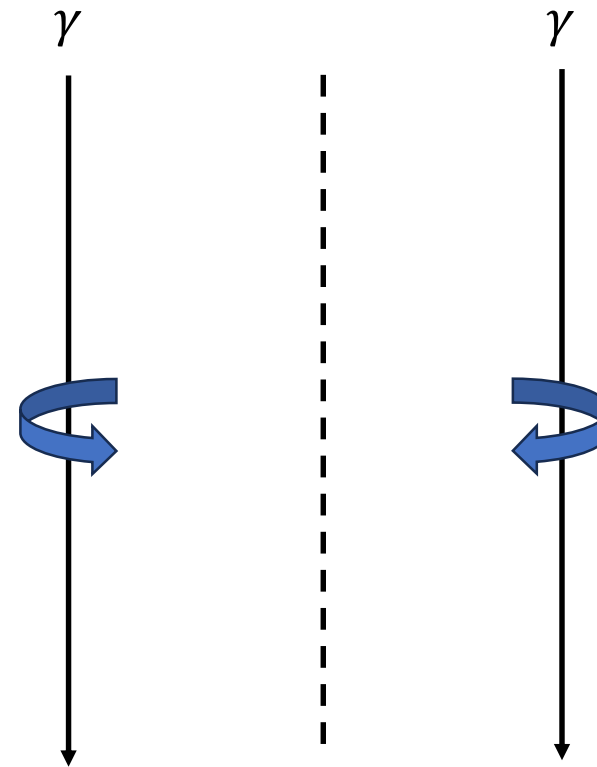
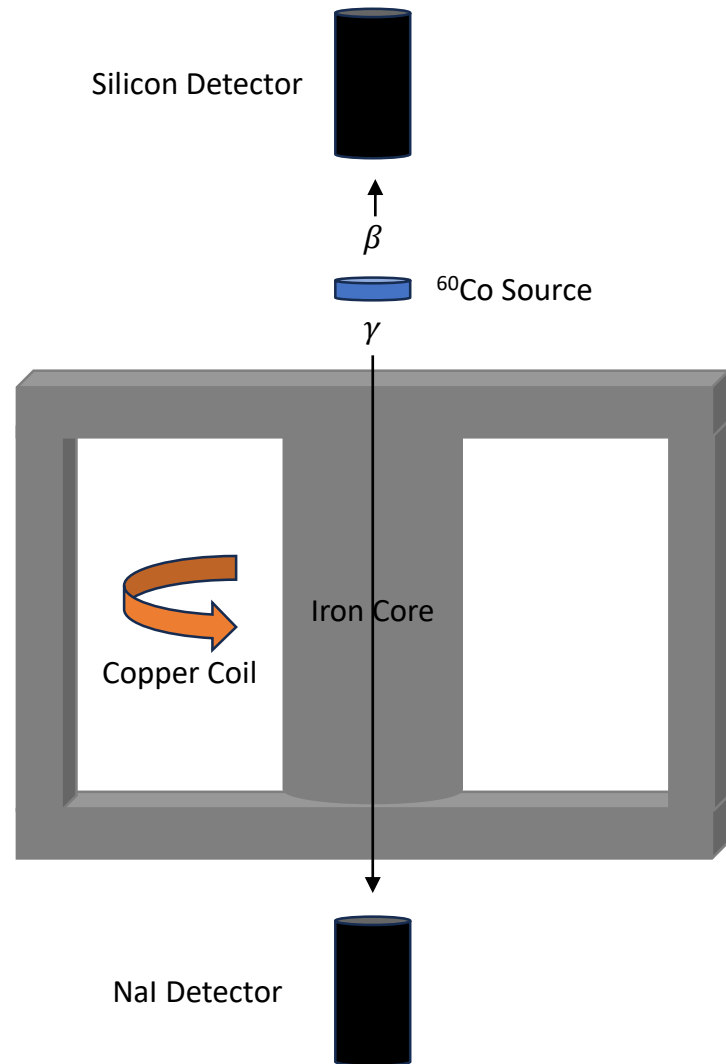
# The First Parity Violation Experiment



# Wu's Experimental Data



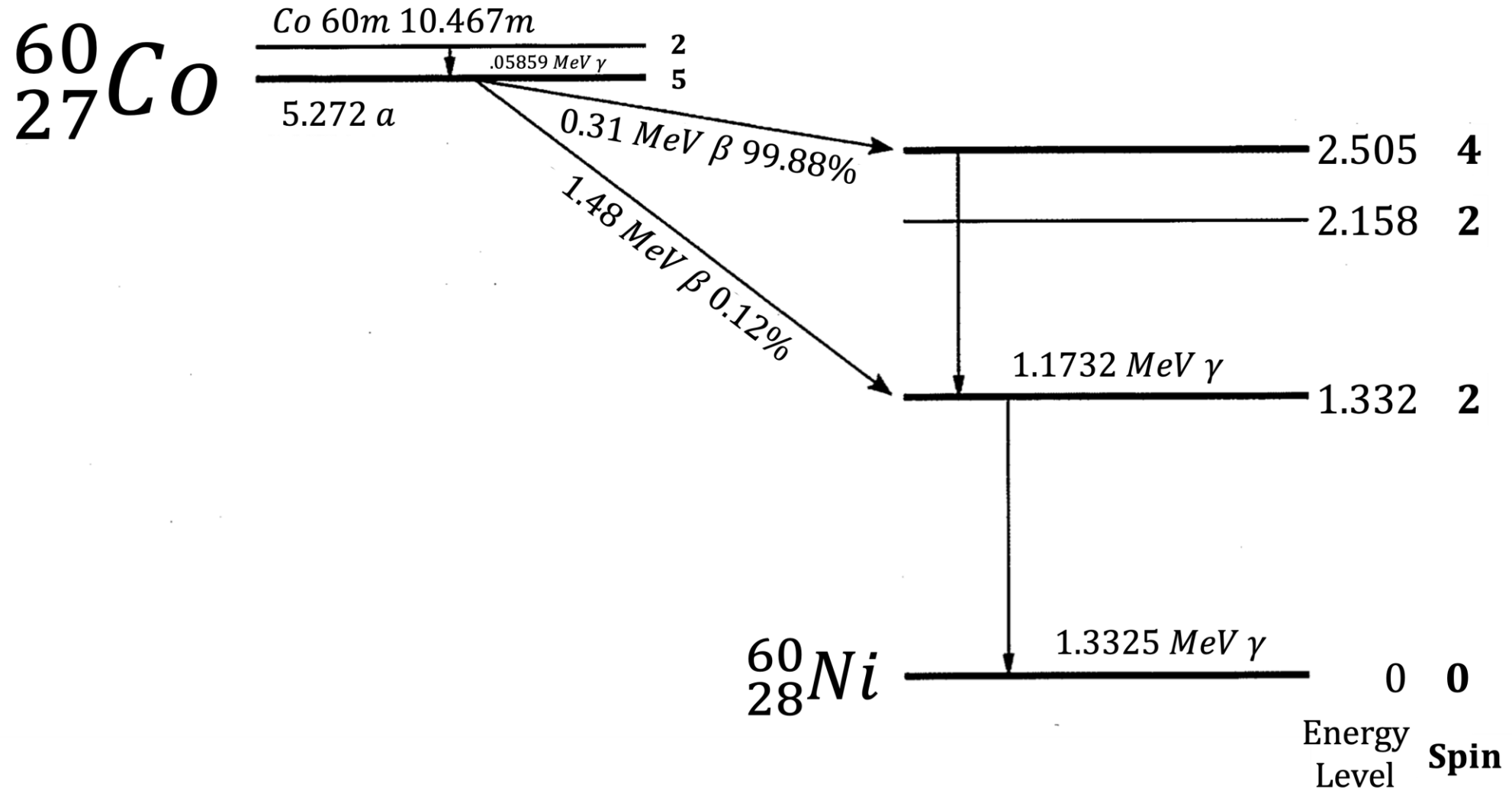
# Houghton University Experiment



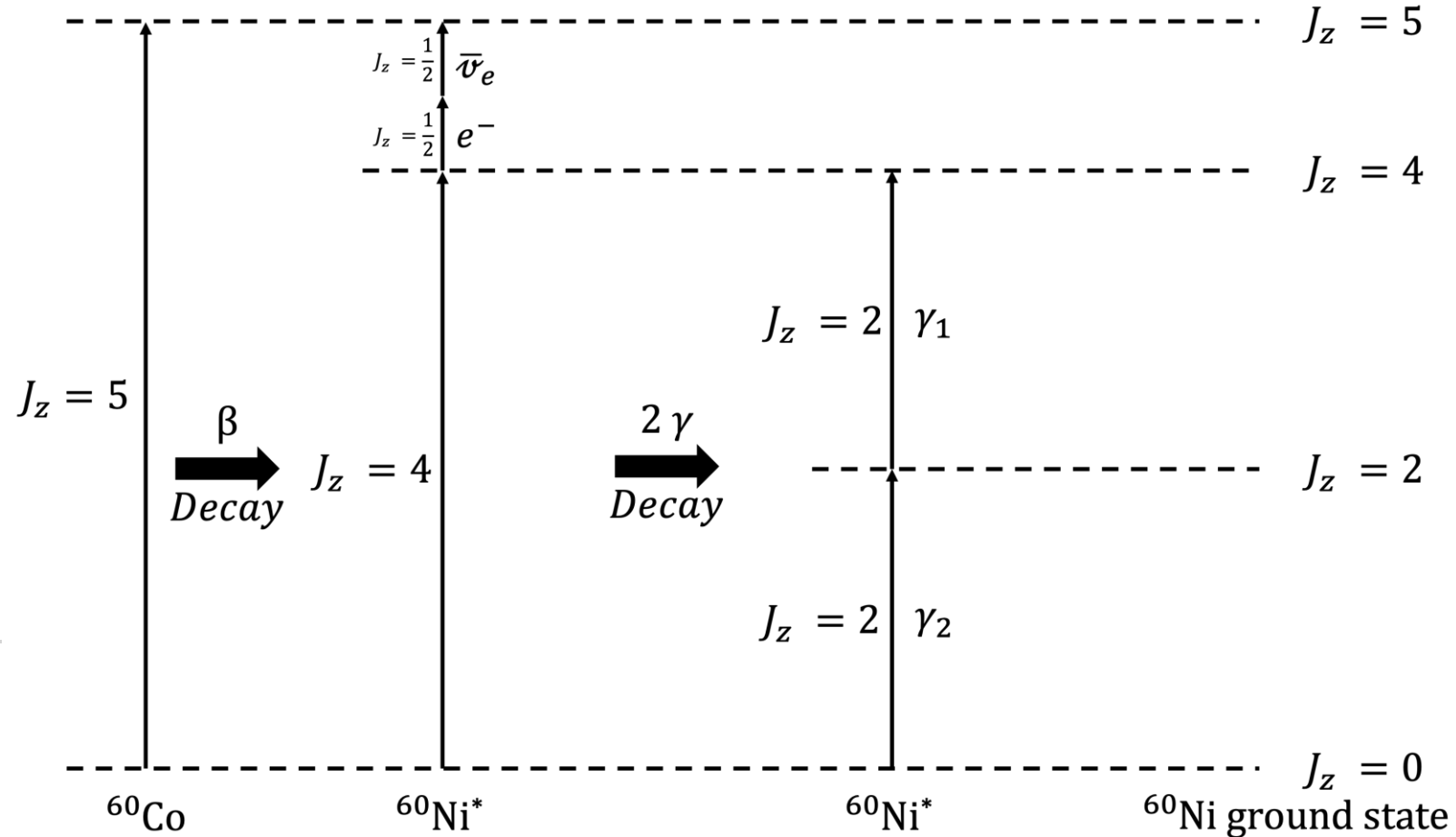
Mirror



# $^{60}\text{Co}$ Energy Level Diagram

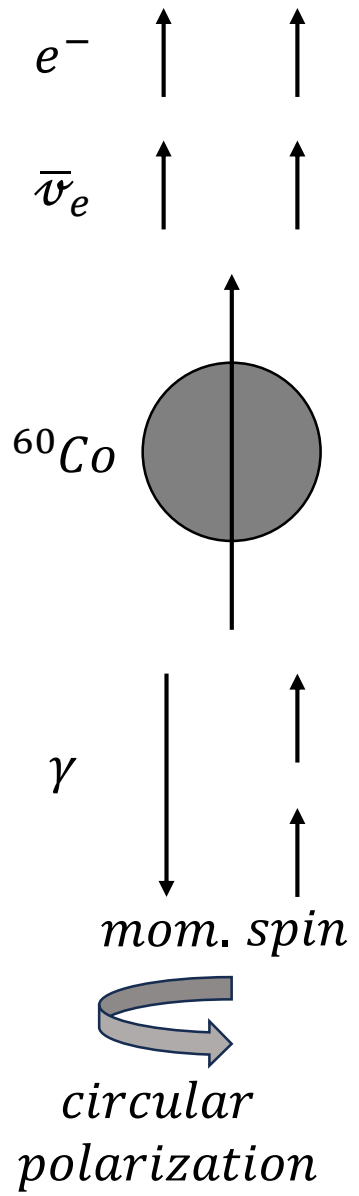


$^{60}\text{Co}$  Z-  
Component of  
Angular  
Momentum

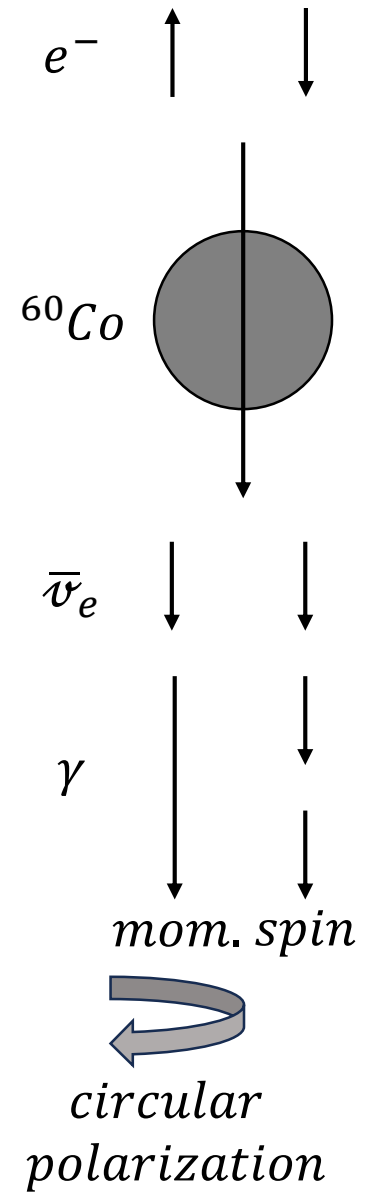


# Spins and Directions

$\beta$  in direction of  $^{60}\text{Co}$  spin



$\beta$  in opposite direction of  $^{60}\text{Co}$  spin



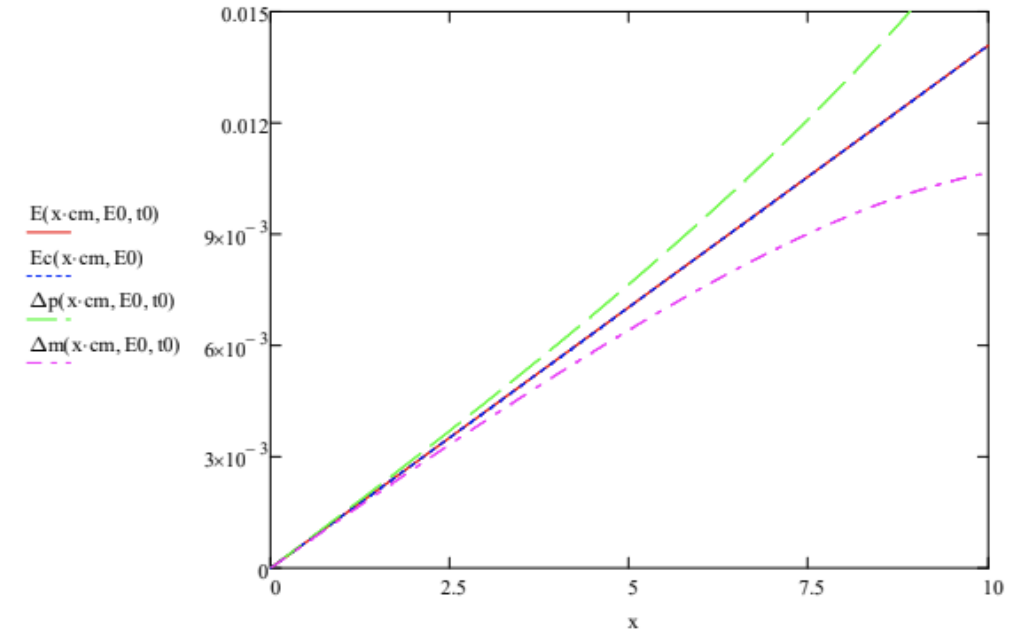
*note that spins are conservative and must be in same direction as  $^{60}\text{Co}$*



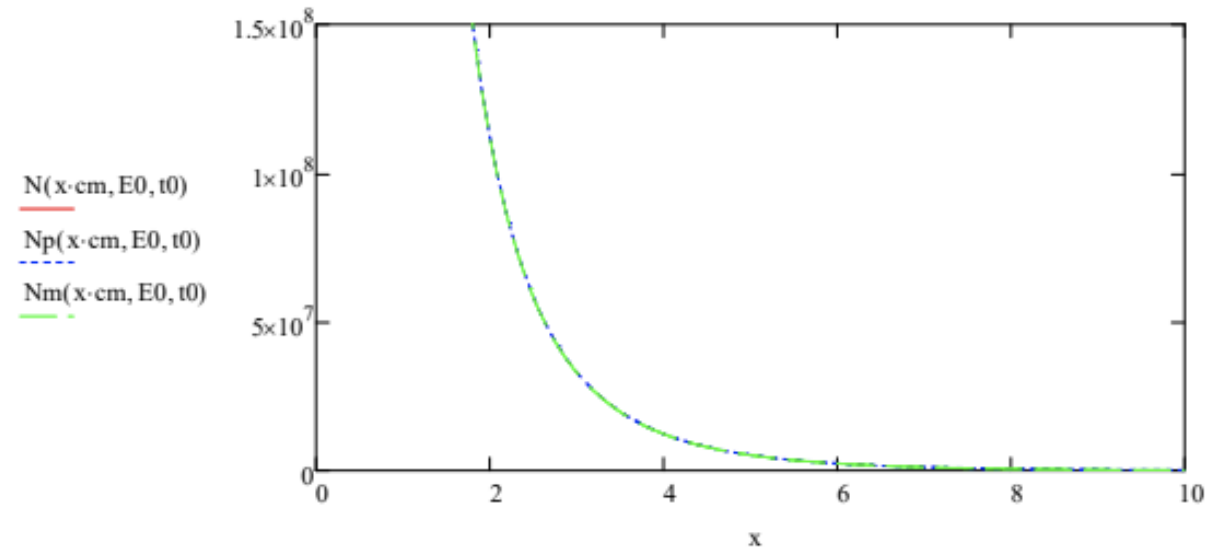
# Asymmetry Predictions

$$E = \frac{N_+ - N_-}{\frac{1}{2}(N_+ + N_-)}$$

Asymmetry with uncertainty as function of x in cm. (fixed E0 and t0)



Number of transmitted gamma rays as function of iron thickness. x in cm.



# Current Status

