

# Nuclear Physics I: Nuclear Astrophysics

## PHYS 8801

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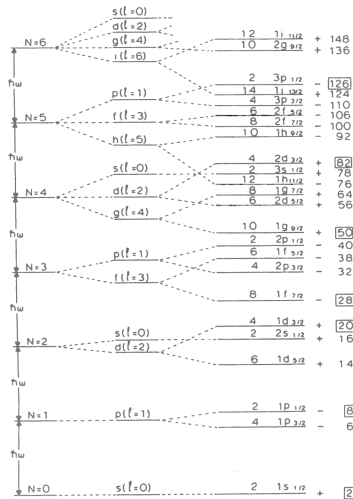
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Nuclear Physics I: Nuclear Astrophysics, Spring 2012

# Agenda

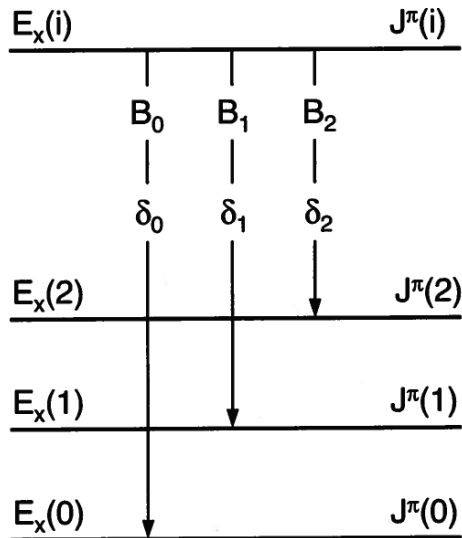
- 1 Nuclear Masses
- 2 De/Excitation and Radioactive Decay

# Shell Model

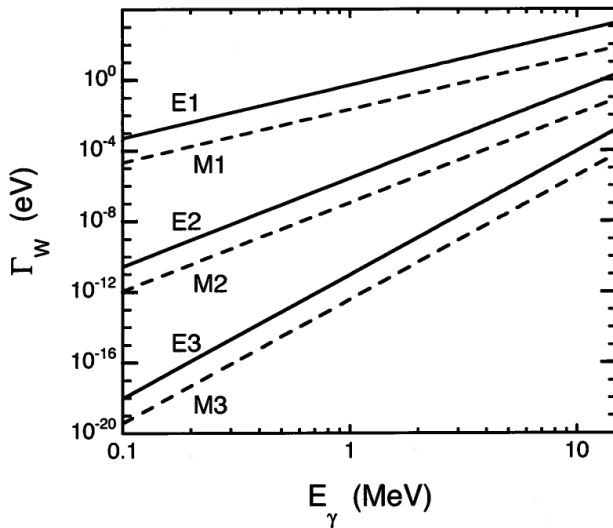


harmonic oscillator  $l=N, N-2, \dots$   $\vec{l}, s$   $N_j = 2j+1$   $nl_j$   $\Pi = (-1)^l \Sigma N_j$

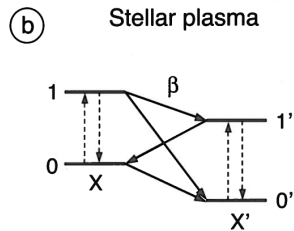
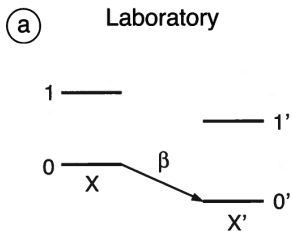
# De-excitation Energy Diagram



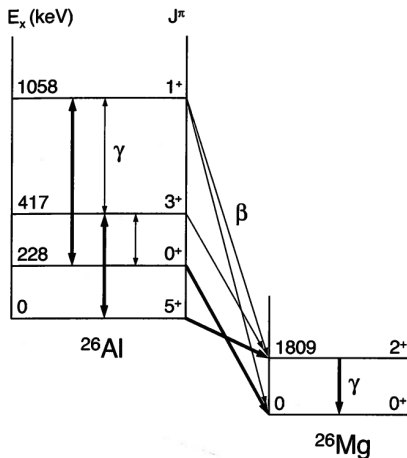
# EM Decay Probabilities



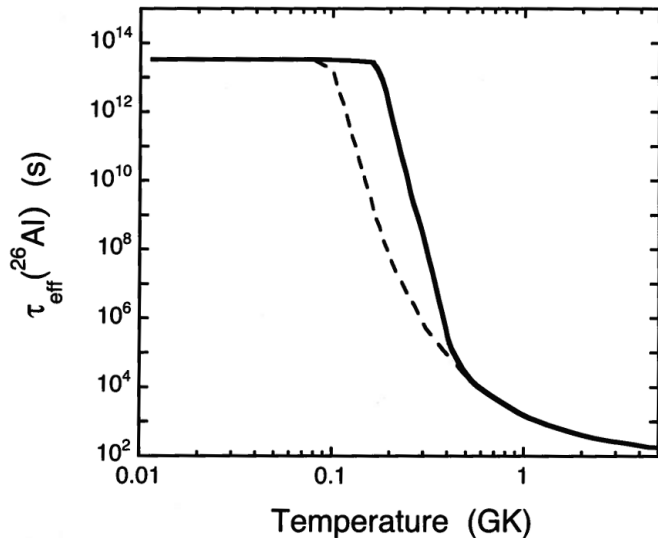
# Decay Levels Plasma and Laboratory



# $^{26}\text{Al}$ Decay Level Scheme

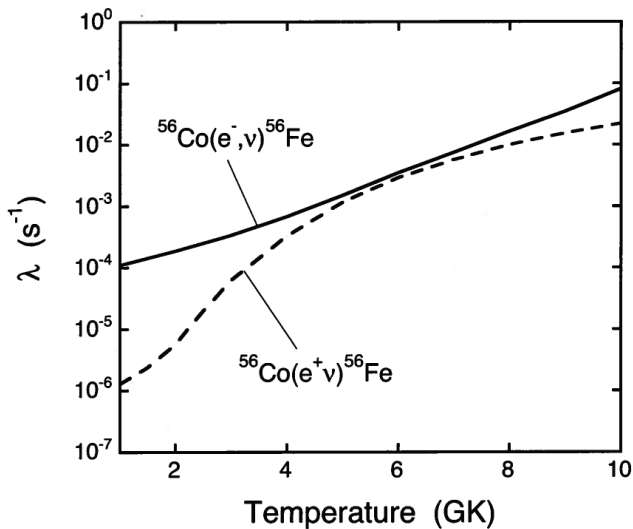


# $^{26}\text{Al}$ Decay Temperature Dependence

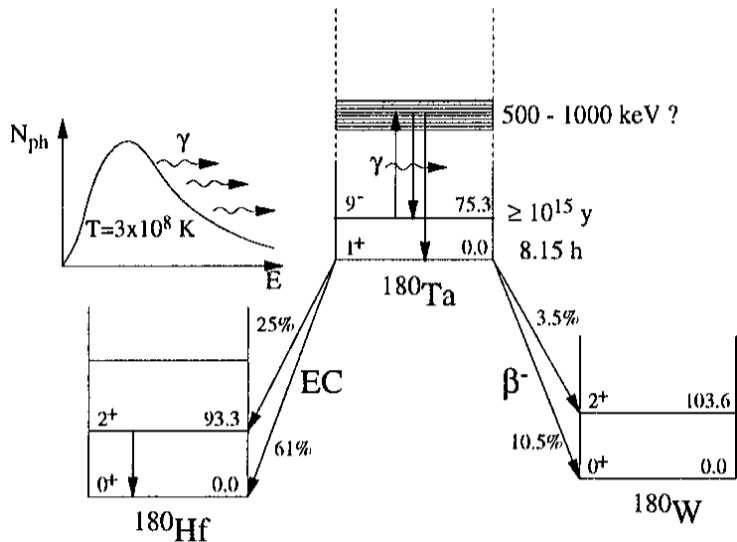




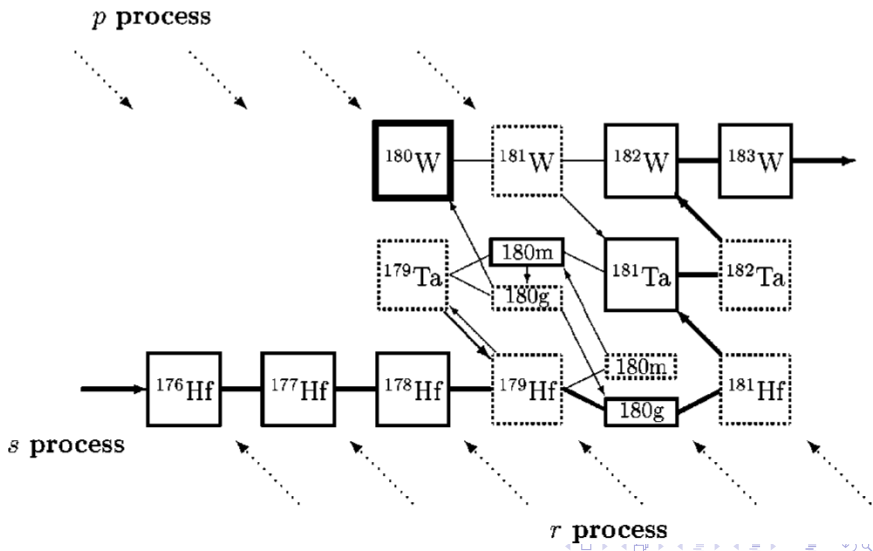
# $^{56}\text{Co}$ Decay Temperature Dependence



# $^{180}\text{Ta}$ Level Scheme



# $^{180}\text{Ta}$ in Chart of Nuclei



# $^{180}\text{Ta}$ Decay – Temperature Dependence

