

NUCLEAR AND PARTICLE PHYSICS
PHY 422/622

ASSIGNMENT I
(DUE MONDAY, JAN. 16)

- (1) A particle A , at rest, decays into two particles – B and C .

$$A \rightarrow B + C$$

Derive an expression for the energy of particle C (E_C). Assume that the particle masses are known.

- (2) Related processes.

- (a) Given that

$$n \rightarrow p + e^- + \bar{\nu}$$

occurs, what other processes may be deduced containing a *neutron* ?

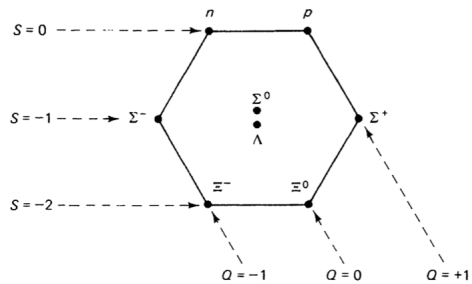
- (b) Which of these processes did Reines and Cowan utilize for their discovery ?

- (3) Which of these processes is allowed or disallowed ? Give all possible reasons.

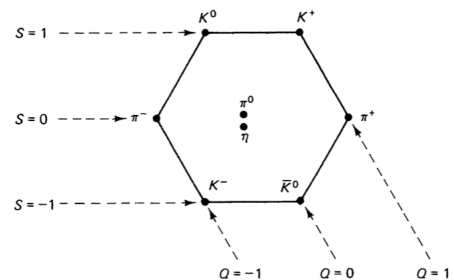
(a) $\pi^- + P^+ \rightarrow \bar{K}^0 + \Lambda$

(b) $P^+ + n \rightarrow P^+ + P^+ + P^- + n$

(c) $e^- \rightarrow \mu^- + \gamma$



The baryon octet



The meson octet

Date: January 4, 2017.