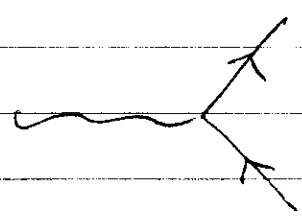


12a) Brown Bolsteri model

$$\gamma + \text{nucleus} \rightarrow p + \text{nucleus}$$

By a dipole transition

the γ excites a particle-hole state in the nucleus



If the ground state of the nucleus is 0^+ then the particle-hole excited state is 1^- because the operator for a dipole transition is given by

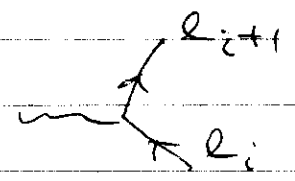
$$H_I = e 2\pi \tau \omega \epsilon$$

τ frequency of photon

ϵ is 1^-

Our goal is to explain the high cross-section of this γ excitation process.

particle hole excitation



because the final state should have opposite parity and $|l_f - l_i| = 1$
(so also $l_i \rightarrow l_i - 1$ would be possible)