SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

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Accredited by NBA (B.E - CSE, EEE, ECE, Mech & B.Tech.IT)
COIMBATORE-641 035, TAMIL NADU

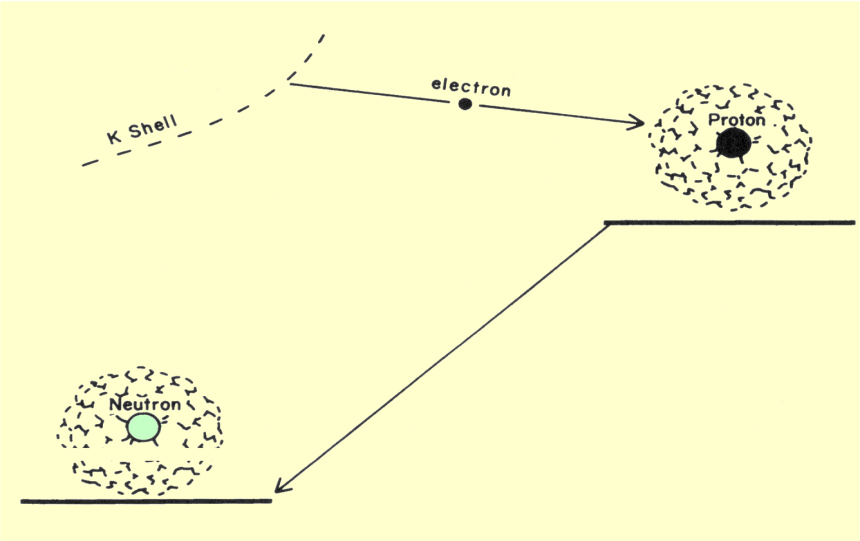
Department of Biomedical Engineering

Course Code & Name: 19BME301 & Medical Physics

III Year : V Semester

Unit I – RADIATION AND RADIOACTIVE DECAY

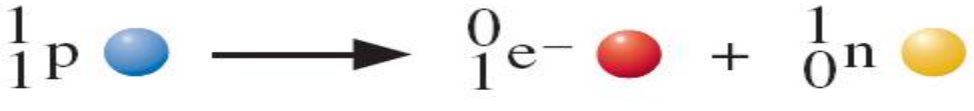
Electron Capture (isobaric transition)



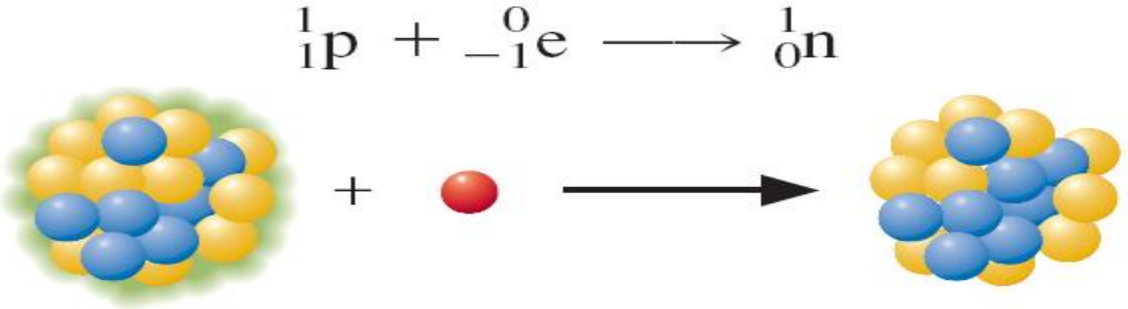
- A nucleus can also relieve a low neutron-proton ratio by capturing and absorbing an electron from a shell.
- This results in the reduction of the atomic number by one unit. Since the mass number does not change, electron capture is an isobaric transition.

Electron capture

The decay of an unstable nucleus by capture of an electron from an inner orbital of the atom. Electron capture is equivalent to a proton converting to a neutron.



$$^{1}_{1}p \longrightarrow {}^{0}_{1}e^{-} + {}^{1}_{0}n$$



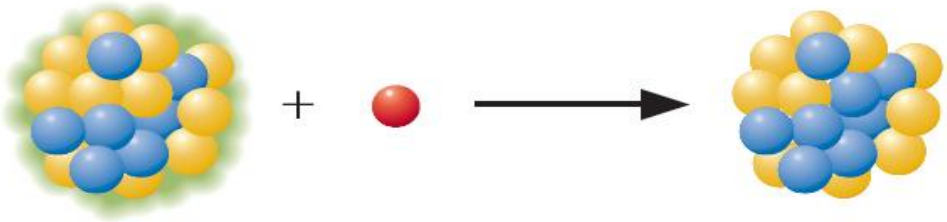
$$^{1}_{1}p + {}^{0}_{-1}e \longrightarrow {}^{1}_{0}n$$

$$^{40}_{19}K + {}^{0}_{-1}e \longrightarrow {}^{40}_{18}Ar$$

electron capture:

$$^{1}_{1}p + ^{0}_{-1}e \rightarrow ^{1}_{0}n + \text{x - ray}$$

$$^{40}_{19}K + ^{0}_{-1}e \rightarrow ^{40}_{18}Ar + \text{x - ray}$$



$$^{40}_{19}\text{K} + ^{0}_{-1}\text{e} \longrightarrow ^{40}_{18}\text{Ar}$$