

Tuesday COLLOQUIUM

Speaker : Prof. B. K. Jain

Title : “Near Threshold Resonances and their Role in Nuclear Physics”

ABSTRACT : In any many body system occurrence of any resonance near threshold has normally a profound effect on its dynamics. For example, the proximity of the ^{12}C 7.65 MeV 0^+ resonance to the ^8Be -alpha threshold, and the closeness of a double alpha resonance to the ^8Be ground state are known to play a crucial role in the hydrogen burning in stars, and producing life-essential elements. The extremely slow conversion through Gamow-Teller β -decay of two protons in its $^1\text{S}_0$ ($T=1$) state into deuteron is known to be responsible for the long life, as it is, of our sun. There may be more such examples.

In present times similar situations arise when we go beyond the neutron-proton degrees of freedom to include mesons and baryon resonances in nuclear dynamics. The resonance $\text{N}^*(1535 \text{ MeV}, \frac{1}{2}^-)$ is found to lie very close to the η meson ($h, 0^-, 550 \text{ MeV}$)-nucleon threshold, and the strange resonance $\text{L}^*(1405 \text{ MeV}, \frac{1}{2}^-)$ occurs just below the K^- ($594 \text{ MeV}, 0^-, S=-1$)-nucleon threshold. These proximities result in a strong attractive interaction in $h\text{-N}$ and $\text{K}^- \text{p}$ systems in s -waves. Such interactions generate a strong possibility for the existence of h^- and K^- nucleus bound states. Searches for the existence of such states have been pursued vigorously worldwide theoretically as well as experimentally. The results of these efforts have been positive, and the Indian researchers have contributed substantially to this search. The talk gives an overall present status of the field.

Day & Date : Tuesday, January 15, 2013

Time : 15:45 hrs

Venue : Seminar Room PFAG14, Prefabs, Near Annabhau Sathe Bhavan, University of Mumbai, Vidyanagari, Kalina Campus, Mumbai - 400 098

All are Welcome