

# Searching for coherent neutrino-nucleus interaction (CENNS) with $M\alpha$ Mossbauer Spectroscopy

*Tuesday 20 March 2018 16:00 (1 hour)*

In this work we study the viability of the Mossbauer technique to measure neutrino-nucleus interaction, specifically Coherent Elastic Neutrino Nucleus Scattering. To describe the neutrino-nucleus interaction we propose a simple collective model in which the  $M\alpha$  Mossbauer-nucleus is considered as an inert core with  $A - 1$  nucleons, and valence neutron. The core is slightly deformed in the direction of the transferred momentum by the weak process involving the  $Z_0$  exchange with the core. Independent particles transitions are Pauli-blocked and only collective transitions are permitted to the core. The very small deformation of the core imposes a perturbative change in the effective potential of the valence neutron. The non perturbed neutron s-state, which is spherically symmetric, is split into two energy level with has a narrow separation. Now the valence neutron can explore energy transition between the  $1/2$  and  $3/2$  spin states. We show that the  $M\alpha$  Mossbauer spectroscopy is able to detect accurately this nuclear state change and it can be used as a new observable associated to CENNS.

## Summary

In this work we study the viability of the  $M\alpha$  Mossbauer technique to measure neutrino-nucleus interaction, specifically Coherent Elastic Neutrino Nucleus Scattering.

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